HITACHI

8mm VIDEO CAMERA/RECORDER

VM-E120E/VM-E220E/VM-E420E

VM-E220E

VM-E120E

VM-E420E

Instruction manual

To obtain the best performance and ensure years of trouble-free use, please read this instruction manual completely.

PRECAUTION

■ **No water, dust or sand**
Be careful that no water, dust or sand enters the camera/recorder because it may cause trouble and accidents.

■ When you shoot at a scene which contains an extremely bright object such as the sun or a light source, a bright vertical bar may appear in the picture.
Your camera/recorder is functioning properly, but the solid-state pickup device (C.C.D) usually causes this as an inherent characteristic. Try to avoid shooting an excessive bright object directly.

■ Do not leave the viewfinder lens facing sunlight for a prolonged period, or the phosphorescent surface of the cathode ray tube may be damaged.

MOISTURE
Avoid operating your camera/recorder immediately after moving it from a cold place to a warm, humid place. Give the camera/recorder 2 to 3 hours to stabilize in the ambient conditions of the surroundings before inserting a cassette. When moved from a cold place to a warm, humid place, moisture may condense on the head drum inside the machine. This moisture could cause the tape to stick to the headwheel and damage the headwheel or tape.
When a small amount of moisture is sensed, "TAPE" flashes in the viewfinder. Remove the cassette and set the Operate switch to OFF, then wait for about one hour.

NOTES:
- This unit uses 8mm video format cassettes.
- It records and plays back in the SP mode (20.05 mm/sec.).

BE SURE NOT TO LEAVE IT IN A PLACE AT HIGH TEMPERATURE EXCEEDING 60°C, OR ITS INTERNAL PARTS MAY DETERIORATE. BE CAREFUL NOT TO LEAVE THE UNIT IN THE FOLLOWING PLACES:
- *** Inside a car with the window closed and in direct sunshine.**
- *** Near heating appliances.**
- *** In direct sunshine in summer.**

WARNING : To prevent risk of injury or damage to your camera/recorder and the AC adapter/charger, use only the specified batteries and AC adapter/charger.
Batteries: VM-BP82G and VM-BP84. (The VM-BP82G is supplied with this camera/recorder.)
AC adapter/charger: VM-AC85E

WARNINGS :
- The Operate switch located on the side of the AC adapter/charger switches the AC adapter/charger on and off.
- As to the indication of the Operate switch, "I" shows ON and "⏻" shows electrical power stand-by.
- The Operate switch is secondarily connected and does not separate the apparatus from the mains supply in the switched-off position.

WARNING : It is permissible to record television programmes only in the event that third party copyrights and other rights are not violated.

- **Differences between Models VM-E120E/E220E/E420E**

	VM-E120E	VM-E220E	VM-E420E
AV Optical Link System	No	No	Yes
EIS function	No	No	Yes
16X9 function	No	No	Yes
FADE function	No	No	Yes
Digital Zoom	No	Yes	Yes

- This instruction manual shows the illustrations for the VM-E220E.

FEATURES

Single-Unit Convenience and Ease of Operation
Your video camera/recorder combines the functions of a video camera and a video tape recorder in one lightweight, easy-to-use instrument. This eliminates interconnecting cables and simplifies operation.

Record and Playback Capability

Record — Your camera/recorder can record directly from the built-in video camera.

Playback — Video/audio played back by the video recorder or fed directly from the camera may be viewed and heard on a TV receiver/monitor by using the audio/video cable.

Digital Zoom up to X24
(For VM-E220E/E420E)
Smooth transitions from optical zoom to digital zoom.

Programme AE (Auto Exposure)
The camera automatically determines the shutter speed and aperture according to the brightness of the subject.

Electronic Image Stabilizer (EIS)
(Only for VM-E420E)
This function corrects slight shaking when zooming in on a distant subject.

AV Optical Link (Only for VM-E420E)
The AV optical receiver receives infrared signals from the camera/recorder's transmitter and plays them back on your TV without the camera/recorder being connected to the TV (The AV optical receiver is optional).

Auto Focus Power Zoom Lens
The 12X autofocus zoom lens uses video auto focus system to automatically maintain focus and to allow you to zoom in and out for tele or wide angle shots at just the touch of the zoom button.

Wireless Remote Control is provided

Fade-in/Fade-out
(Only for VM-E420E)
Use this function to make the picture appear and disappear gradually. You can select three fade modes — fading-in from a white picture (white fading), fading-in from a black picture (wipe fading) and fading-in while zooming (zoom fading).

Automatic Title Recording
This function automatically records the created title on the tape together with the date for about 10 seconds after recording is started.

Date Search
The date search function memorizes the start and end positions of recordings you made on a specific day so you can easily locate those positions later as long as the cassette is left in the camera/recorder.

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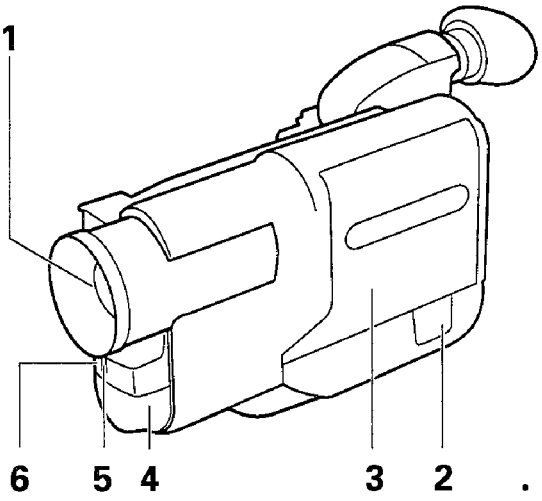
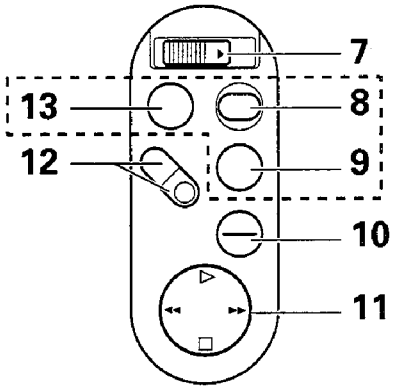




- Buttons 8, 9 and 13 are only provided with the VM-E420E.

1. Lens
F1.6 (4 ~ 48 mm) 12X power zoom lens features with auto focus and auto iris functions.

2. Cassette Holder Close Button
CAUTION: Be sure to press this button to close the cassette holder. Otherwise, the tape may become slack and may be damaged.

3. Cassette Holder
Slide EJECT switch to open the cassette holder. Be aware of the cassette direction when inserting.
NOTE: Power source must be connected to open the cassette holder.

4. Microphone

5. Record Indicator
This indicator lights up to indicate that the camera/recorder is recording.

6. Infrared Ray Receiving Section
Receives infrared rays from the remote control unit.

7. EJECT Switch
Operates with Operate switch either on or off, if a power source is connected to the camera/recorder.

8. EIS (Electronic Image Stabilizer) Button (Only for VM-E420E)
Press to display " " in the viewfinder. EIS corrects slight shaking of the image to be recorded.

9. 16x9 Button (Only for VM-E420E)
With this button the picture format can be switched from 4:3 (picture format of a normal TV set) to 16:9.

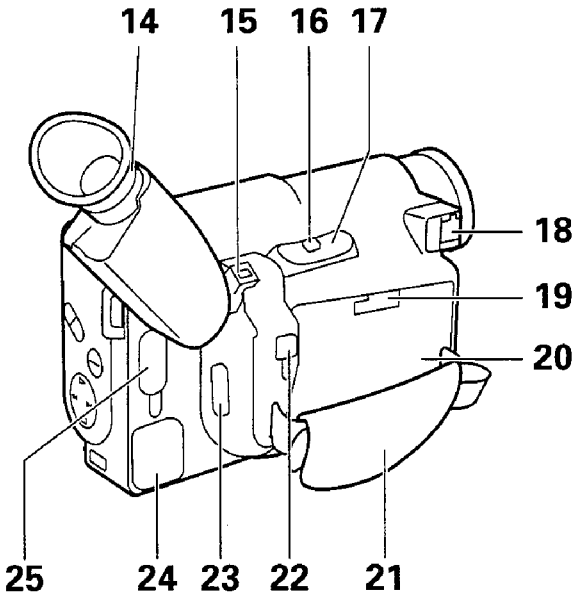
10. DATE/TITLE (DISP.) Button
Use this button to record the date, time and title on your tape. Any time that the date, time and title displays appear in the viewfinder, they are recorded on your tape. This button can be used instead of DISPLAY button on the remote control in the recorder mode.
NOTE: Be sure to insert the clock battery before setting the date and time or creating a title.

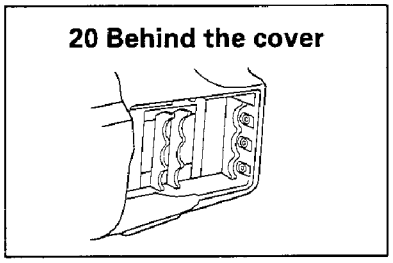
11. Ring of Tape Transport

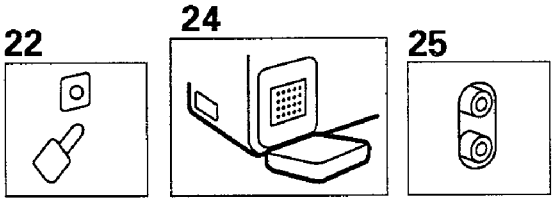
▶▶ – F.F Button
Press this button during stop or rewind mode, and fast-forwarding starts. Press the button during playback of tape, and the tape is played back in the forward direction approximately 7 times faster than the normal speed to confirm the recorded content. Press PLAY button to return to normal playback mode or press STOP button to stop tape movement. Also use F.F button when setting the date/time.
NOTE: You can also visually scan forward when the camera/recorder is in record/pause (stand-by) mode by pressing and holding this button.

□ – STOP Button
The STOP button is used to stop playback, rewind, and fast forward operations. The STOP button has no effect during record operation. Also use STOP button when setting the date/time.

◀◀ – REW Button
Press this button during stop or fast forward mode, and fast-rewinding starts. Press the button during playback of tape, and the tape is played back in the rewind direction approximately 5 times faster than the normal speed to confirm the recorded contents. Press PLAY button to return to normal playback mode or press STOP button to stop tape movement. Also use this button to review the last few seconds of the tape you are recording. Use REW button when setting the date/time.
NOTE: You can also visually scan backward when the camera/recorder is in record/pause (stand-by) mode by pressing and holding this button.







(Behind the jack covers)

▷ – **PLAY Button**
Used for playback of tape.
NOTE: When the camera/recorder is in record/pause (stand-by) mode, pressing and holding this button will play the tape at normal.

12. FOCUS Control Buttons
Press these buttons simultaneously to switch between automatic and manual focusing. When "FOCUS" is not displayed in the viewfinder, focusing is automatic.
If these buttons are pressed at the same time and "FOCUS" appears, the camera/recorder enters the manual focus mode. For manual focusing, press the F or N button to bring the subject into focus.

13. FADE Button (Only for VM-E420E)
During recording you can add a professional touch to your recordings by fading in and out of the scenes. You can select the three fade modes — the white fade, wipe fade and zoom fade.

14. Diopter Control
To use the electronic viewfinder, turn this control for your optimum focus adjustment.

15. Operate Switch
This turns the camera/recorder on and off and also switches between the camera and recorder modes. Set the switch to "CAM" to turn the camera's power on and to "VIDEO" to turn the recorder's power on. Press and hold the small red button in the switch to switch it.

16. INST. ZOOM (Instant Zoom) Button
Use this button to magnify the image being recorded 1.5 times momentarily.

17. Power Zoom Switch
This switch performs zooming electrically.
"W": Picture becomes wider gradually.
"T": Picture becomes telescopic gradually.

18. Camera Light Shoe
Used to attach the camera light.

19. OPEN Lever
Use this to open or close the cover of the power supply attachment section.

20. Power Supply Attachment Section (Behind the cover)
Attach the battery pack (provided) or alkaline batteries here.

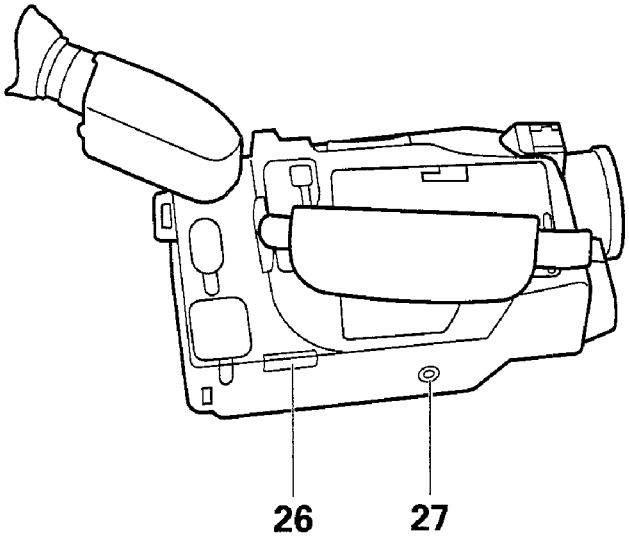
21. Hand Strap
Adjust to best fit to your hand. (Refer to page 7.)

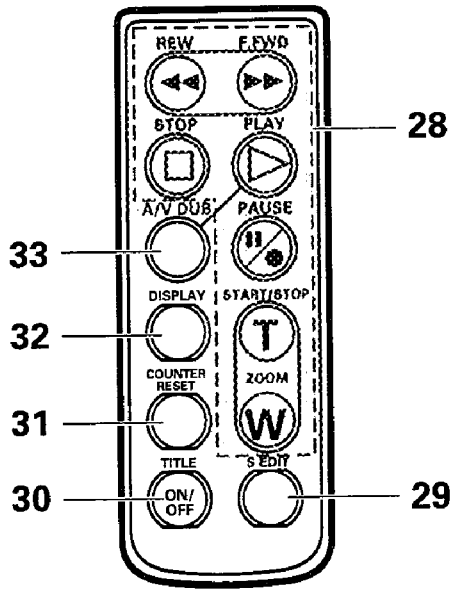
22. DC IN Jack (Behind the jack cover)
When using the AC adapter/charger, connect one end of the DC cord (provided) to this jack and the other end to the DC OUTPUT jack of the AC adapter/charger. When using the car battery cord (optional), connect this jack and the DC OUTPUT jack of the car battery cord.

23. Start/Stop Button
This button is used to control the camera/recorder.
When this button is pressed with the camera/recorder set to the record/pause mode, the tape runs to start recording.
When this button is pressed again, the tape stops and the camera/recorder enters the record/pause (stand-by) mode. This button may also be used to display a still picture during playback mode.

24. AV OUT Jack (Behind the cover)
Use the RF output adapter (optional) to connect this jack to a TV to view the pictures played back by the camera/recorder.

25. AV OUT Jacks (Behind the cover)
You can use the audio/video cable (provided) to connect this jack to a TV when viewing the playback picture on the TV, etc.





26. Clock Battery Compartment
Pull the battery holder and install the lithium battery (provided).

27. Tripod Mount Screw
Use this screw to mount the camera/recorder on a tripod (generally available).

28. Camera/Recorder Control Buttons
These shaded buttons on the remote control function the same as those on the camera/recorder.

29. S. EDIT (Synchro Edit) Button (only on the remote control)
Use this button to activate the synchro edit function for dubbing.

30. TITLE ON/OFF Button (only on the remote control)
Use this button to store a title in memory or recall the stored title and record it superimposed on the picture being shot.

31. COUNTER RESET Button (only on the remote control)
Press this button to reset the linear time counter in the viewfinder to "0:00:00".

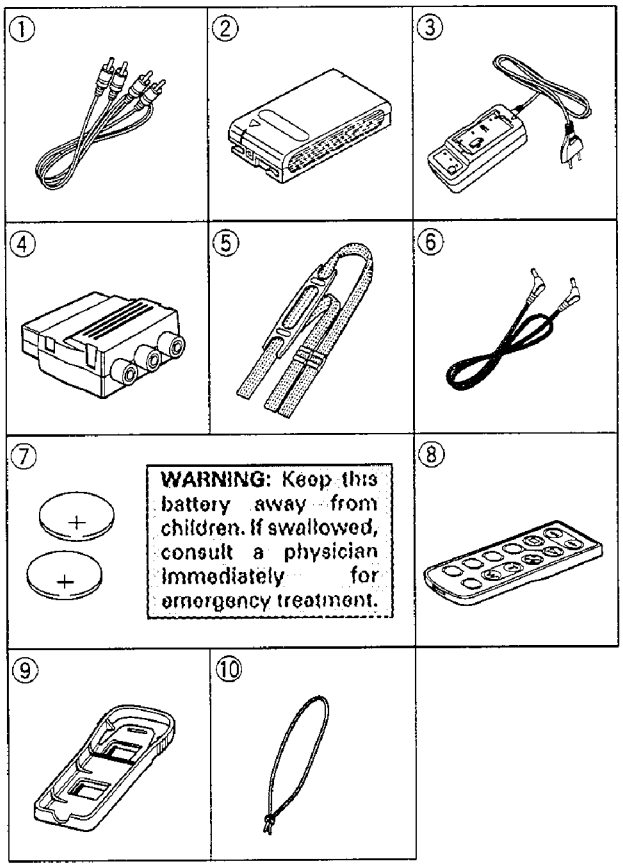
32. DISPLAY Button
Use this button to select the display in the viewfinder.
This button can be used instead of the DATE/TITLE button on the camera/recorder in the recorder mode.

33. A/V DUB Button (only on the remote control)
This button is used to record new audio and video in place of existing audio and video.

ACCESSORIES

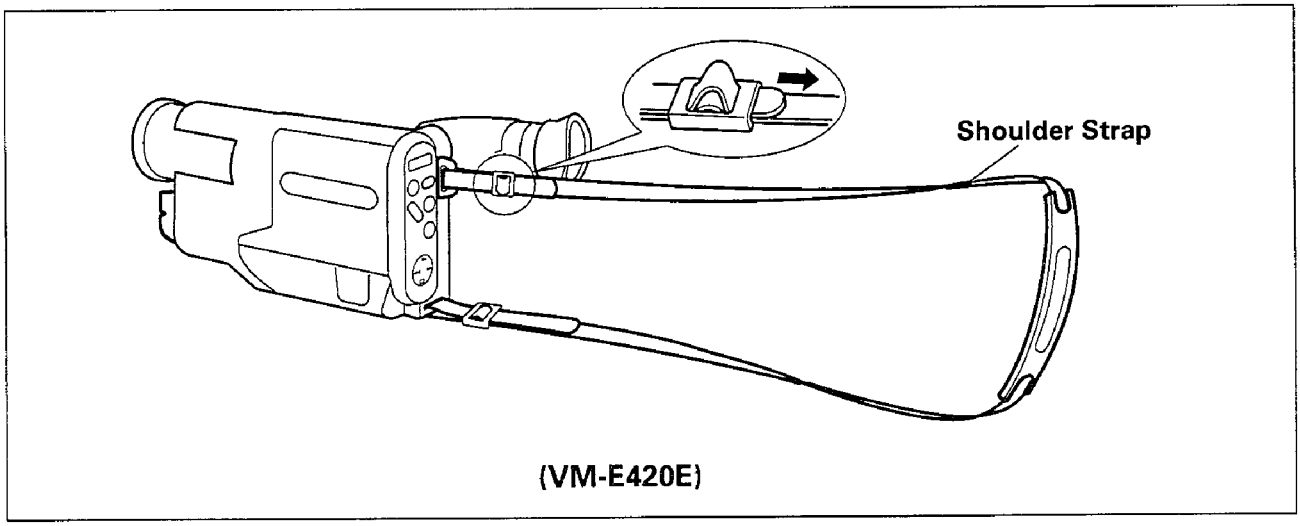
Check to make sure you have the following components and accessories (besides the camera/recorder unit itself) before disposing of the packing material.

1. Audio/Video Cable
2. Battery Pack
3. AC Adapter/Charger
4. AV Plug Adapter (Peri)
5. Shoulder Strap (Only for VM-E420E)
6. DC Cord
7. Batteries for Date/Time and Remote Control (CR2025)
8. Remote Control
9. Remote Control Holder
10. Lens Cap String



HOW TO INSTALL THE SHOULDER STRAP (Only for VM-E420E)

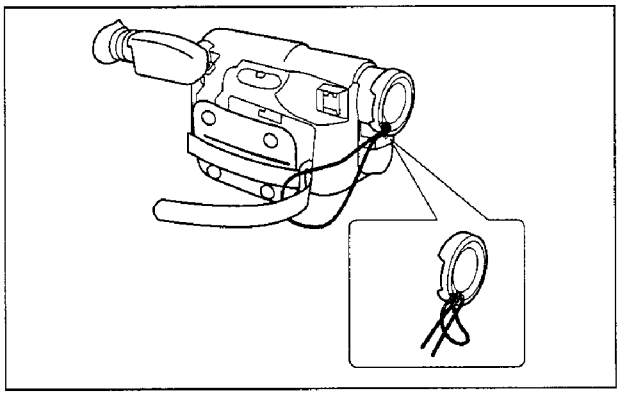
Attach the shoulder strap as illustrated below.
NOTE: When carrying the camera/recorder with the shoulder strap, put the electronic viewfinder down to its original position so that direct sunlight does not enter the viewfinder.



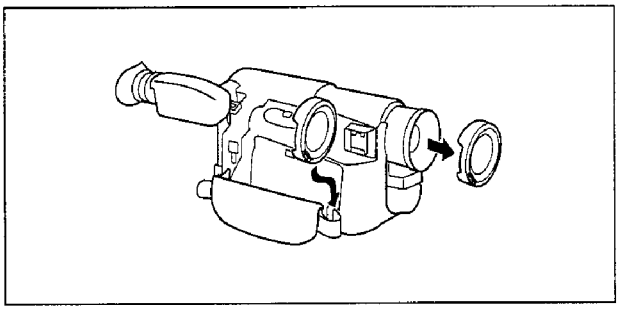
(VM-E420E)

LENS CAP

Using the lens cap string:
Pass the string through the lens cap and grip belt and attach it as shown in the figure.

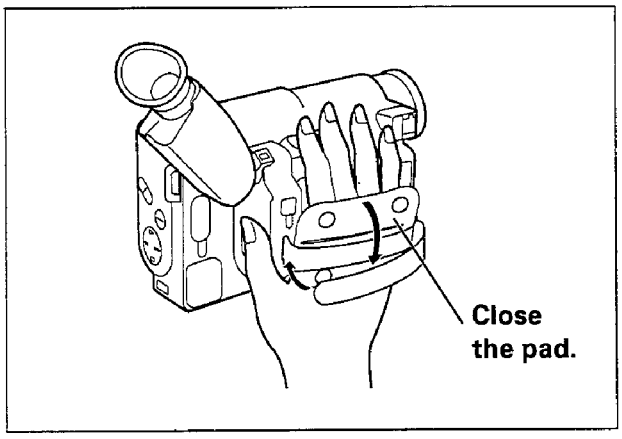


Removing the lens cap:
Attach the lens cap to protect the lens when carrying or storing the camera/recorder. During shooting attach the lens cap as shown in the figure to prevent it from being lost.



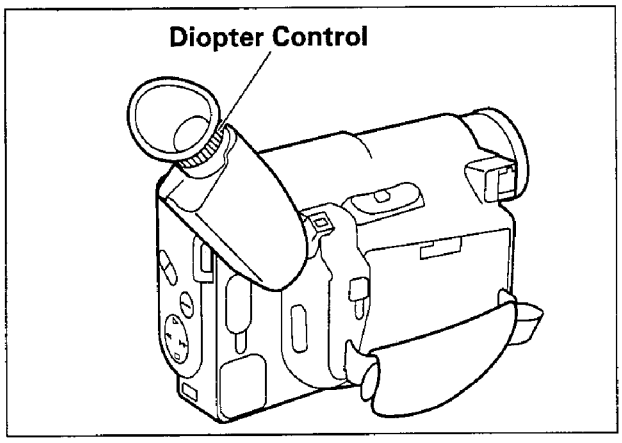
ADJUSTING THE HAND STRAP

After adjustment, hook the hand strap's pad securely.
Adjust the length of the hand strap so you can press the Start/Stop button and power zoom switch easily with your fingers.



EYEPIECE ADJUSTMENT

To use the electronic viewfinder, adjust the diopter control for optimum focus adjustment.

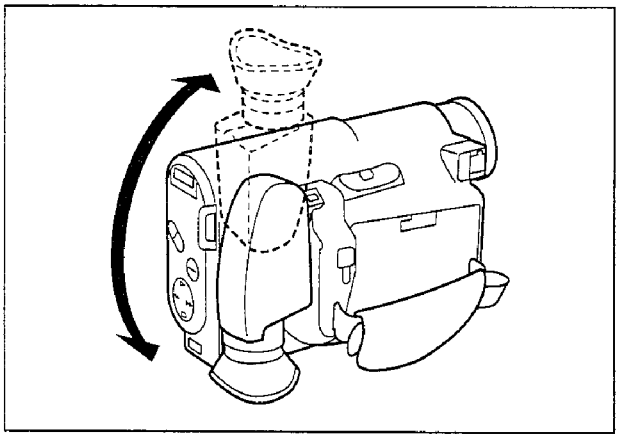


ELECTRONIC VIEWFINDER POSITION ADJUSTMENT

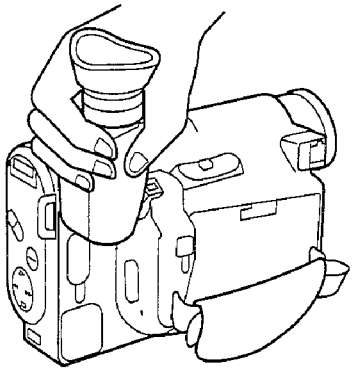
Adjust the electronic viewfinder to a position where you can see through it easily.

NOTES:

- Put the viewfinder back to original position when storing the camera/recorder into the carrying case or carrying the camera/recorder.
- Do not point the electronic viewfinder to direct sunlight; it could damage the viewfinder.



CAUTION:
Do not hold the unit by the electronic viewfinder when carrying as this could cause a malfunction.



PROGRAMME AE (Auto Exposure)

Programme AE automatically selects the shutter speed 1/50, 1/100, 1/150, 1/250, 1/350, 1/500, 1/750, 1/1000, 1/1500, 1/2000 or 1/4000 second that is optimum for the brightness of the subject. The iris is also adjusted automatically in response to the shutter speed.

FLYING ERASE HEAD

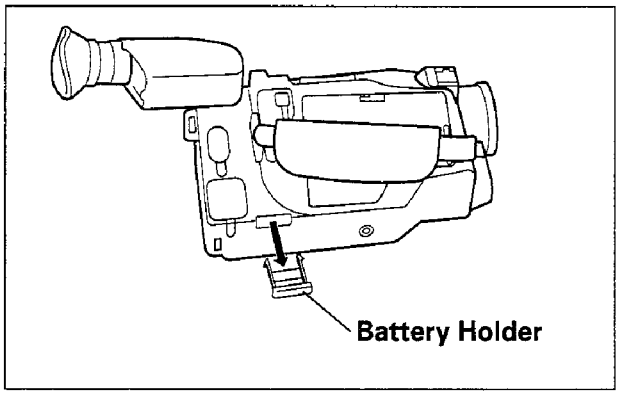
A rotating erase head which eliminates glitches and rainbow noise that occurs at the joints between recordings in previous models.

LOADING THE LITHIUM BATTERIES

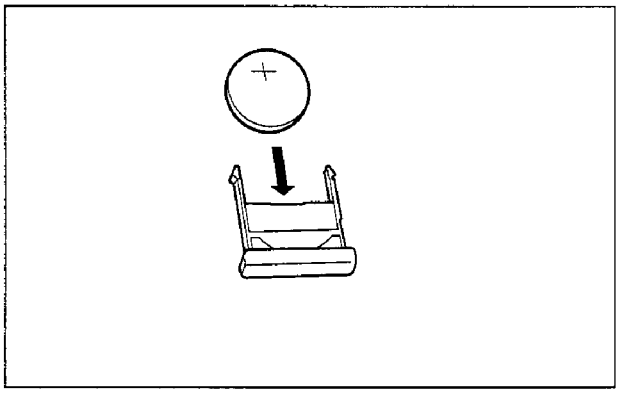
You may want to install the lithium batteries (provided) immediately to prevent losing them.

■ Clock battery

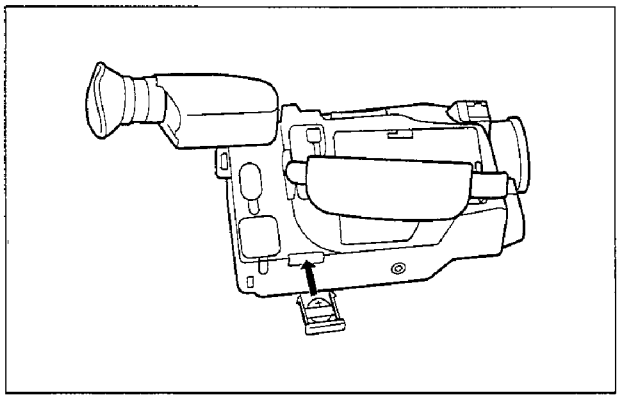
1. Pull out the battery holder.



2. Insert the battery with the "+" terminal facing up.

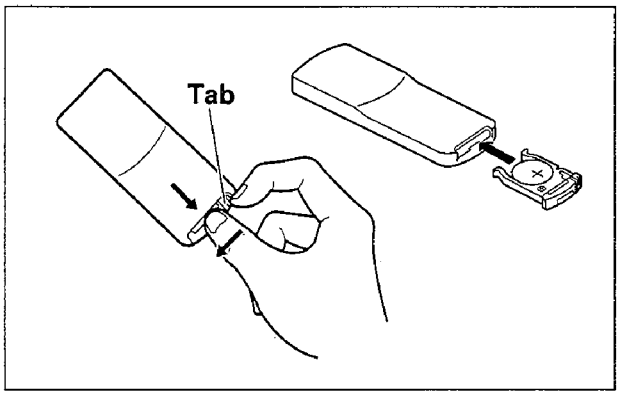


3. Fully insert the battery holder into the camera/recorder.



■ Remote control battery

1. Push the tab to the left and hold it, then pull out the battery holder.



2. Insert the battery with the "+" terminal facing up as shown in the figure.
3. Replace the battery holder with battery in the remote control making sure that it is full inserted.

NOTE: When replacing the batteries, use 3V micro lithium battery CR2025.

This product uses the lithium batteries which contain dangerous chemicals. Handle and dispose of with great care.

WARNING

- Keep the batteries away from children and pets. If swallowed consult a physician immediately for emergency treatment.
- Keep the batteries in a dark, cool, dry place.
- Do not throw the batteries in a fire.
- Do not short circuit the batteries.
- Do not disassemble the batteries.
- Do not hold the batteries with the metallic tweezers.
- Do not re-charge the batteries.
- Wipe the batteries with dry cloth and set properly confirming ends (+,–).
- After use please bring back to retail shop.

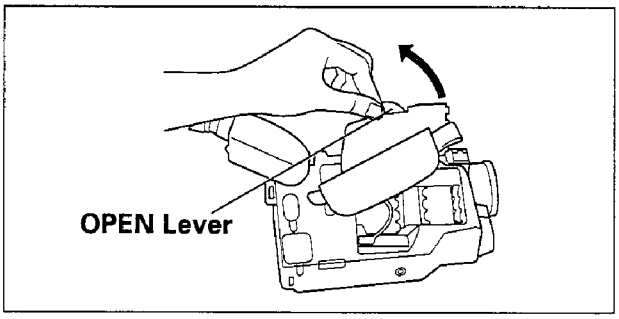
POWER SOURCES

NOTE: Be sure to turn off power of the camera/recorder when attaching or detaching a power supply (battery, AC adapter/charger, etc.) to the camera/recorder.

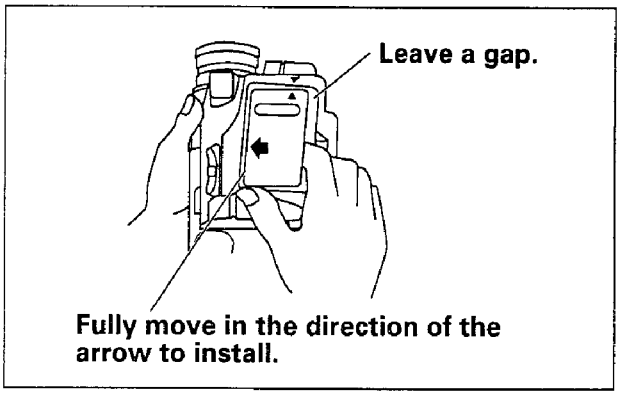
■ WHEN USING WITH BATTERY (provided)

NOTE: The battery must be charged before it can be used for the first time. Refer to "CHARGING THE BATTERY" on page 14.

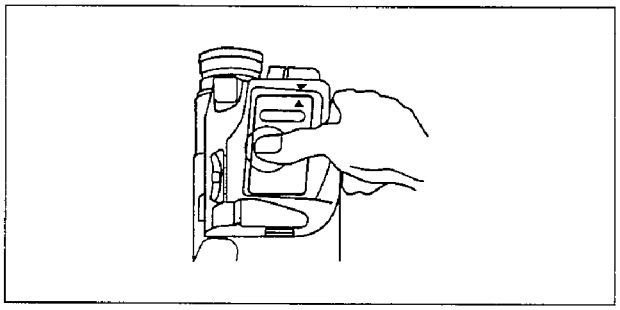
1. Lift the OPEN lever and pull it up. The power supply attachment cover will open.



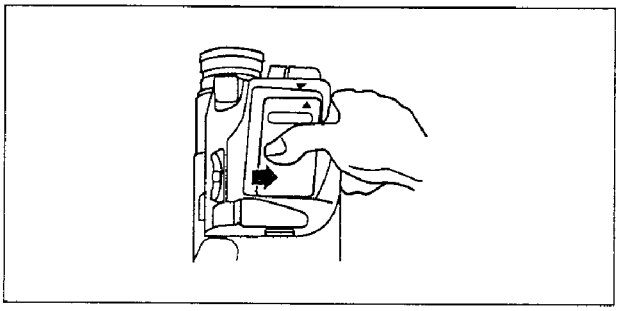
2. With the battery compartment facing you, align arrow on the battery with the arrow on the camera/recorder.



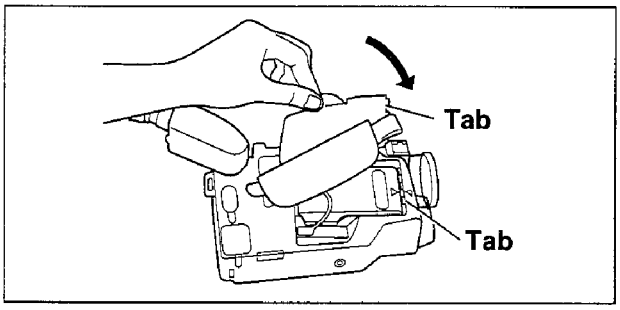
3. Once the arrows are aligned, push down on the battery.



4. While pushing down the battery, slide it to the right until it "clicks" into place.



5. After installing the battery, close the cover. Hold the OPEN lever and align the tabs on both sides of the cover with the end of the attachment section.

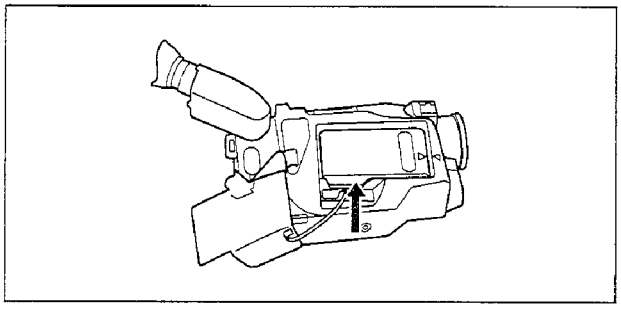


NOTES:

- If the OPEN lever is flat, the cover will not close.
- Always remove the battery from the camera/recorder after use.
- We cannot guarantee that the camera/recorder will not malfunction if you use battery packs other than those specified.
- Always attach a battery by the procedure described here. Attaching a battery forcibly could damage it.

■ Removing the battery pack

1. Lift the OPEN lever and pull it up. The power supply attachment cover will open.
2. Push the side of the battery in the direction of the arrow. A click will be heard and the battery is released.

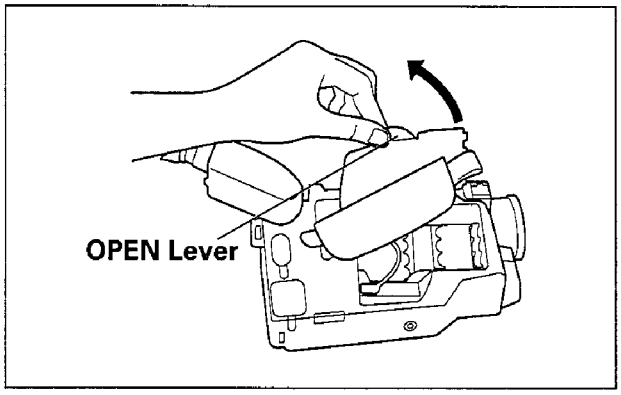


3. Remove the battery and close the cover.

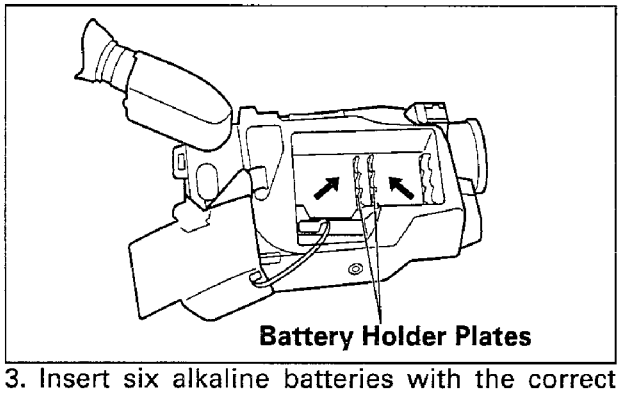
■ WHEN USING WITH ALKALINE DRY-CELL BATTERIES

The camera/recorder can be powered by six alkaline dry-cell batteries inserted into the power supply attachment section. The continuous operation time of the camera/recorder depends on the type of alkaline batteries used.

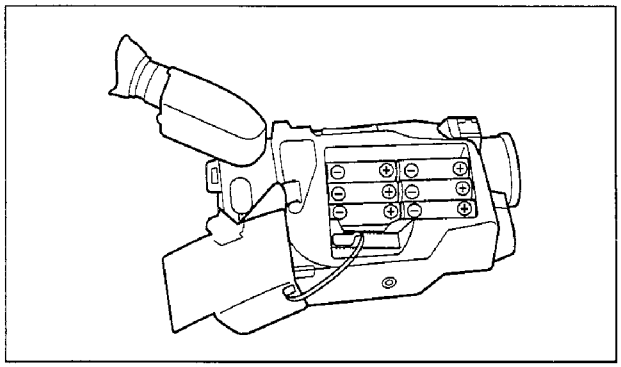
1. Lift the OPEN lever and pull it up. The power supply attachment cover will open.



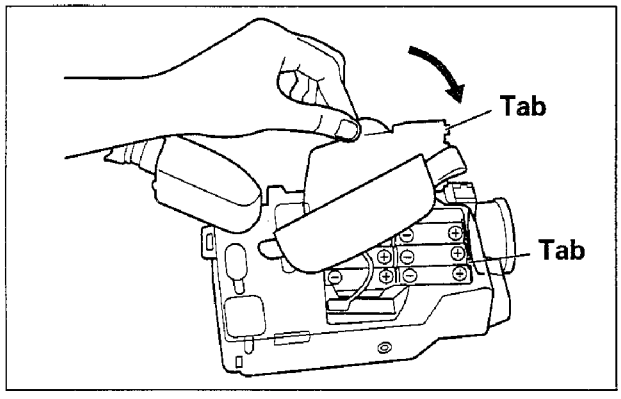
2. Lift the battery holder plates at the centre of the attachment section.



3. Insert six alkaline batteries with the correct polarities.



4. After installing the batteries, close the cover. Hold the OPEN lever and align the tabs on both sides of the cover with the end of the attachment section.



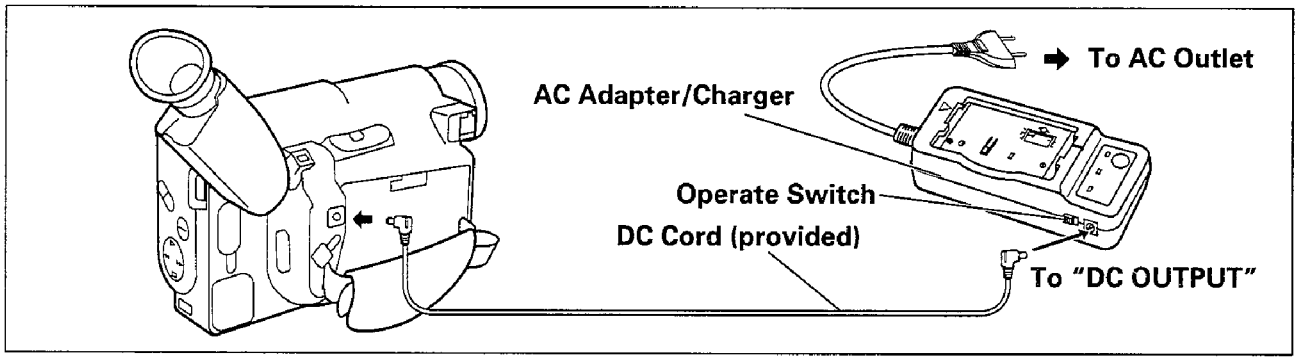
NOTES:

- Use only "IEC R6" alkaline batteries marked "LR6" (Manganese batteries cannot be used to power the camera/recorder.)
- It is recommended that you use alkaline batteries within the recommended period of use or within two years of the date of manufacture.
- Be careful of the following to prevent the leakage of liquid or an explosion.
  - Check that the orientation (polarity) of the batteries is correct.
  - Remove the batteries when not using the camera/recorder.
  - Remove the used batteries from the camera/recorder.
  - Do not use batteries made by different manufacturers at the same time.
  - Do not use old and new batteries at the same time.
- If the liquid leaks, remove the batteries immediately and ask your nearest dealer to inspect the camera/recorder (this will be at your own expense).
- Do not let the batteries or the terminals of the camera/recorder get dirty. If they are dirty, use a dry cloth to wipe off the dirt completely.
- It is recommended that you use a battery pack to power the camera/recorder when using a DC camera light. If a camera light is used when the camera/recorder is powered by batteries, the required supply voltage will be very short and the camera/recorder will turn off soon.
- When the batteries are used to power the camera/recorder in a cold place, it may not operate normally; the operation time may become extremely short or the camera/recorder may not be turned on. It is recommended that you use a battery pack to power the camera/recorder in a cold place. (At 10°C, the chemical reaction decreases the capacity of battery to one tenth when compared to that at normal temperature 20°C.)
- Since the supply voltage from batteries decreases more abruptly when compared to that from a battery pack, the battery remaining level indicator ( ) may not flash in the viewfinder, noise may occur, the picture and sound may not be recorded normally and/or the power may be turned off soon. These phenomena occur because the capacity of batteries becomes low. So turn the power switch off and replace the batteries. If the power switch is left turned on in this state, the power may turn on temporarily and turn off again repeatedly.

- Noise may appear momentarily in the viewfinder when recording is started or stopped.
- Be careful when touching the batteries with your bare hand to remove them as they are warm during and just after use.

CAUTION: Be sure not to short, disassemble, heat or throw batteries into fire. This is very dangerous.

■ WHEN USING WITH THE AC ADAPTER/CHARGER (provided)



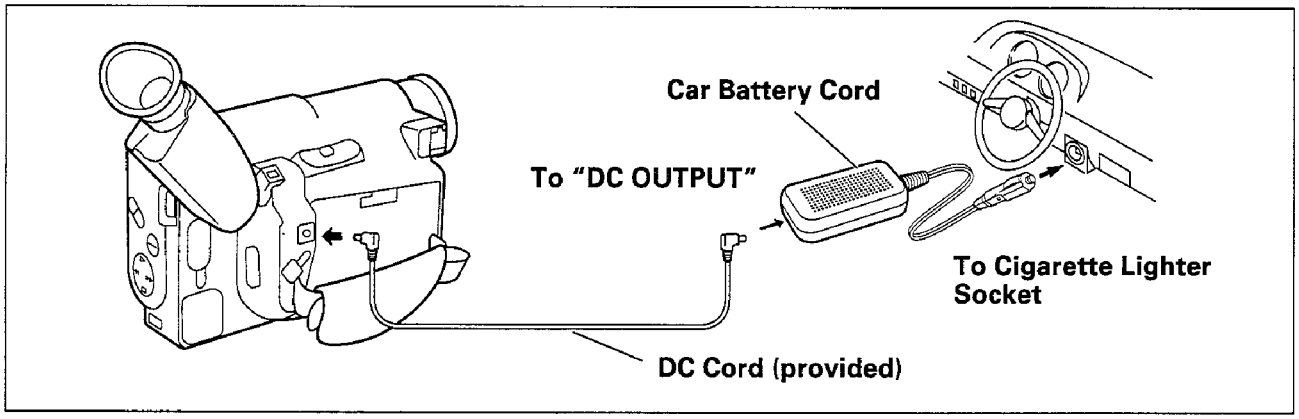
1. Connect one end of the DC cord (provided) to the camera/recorder as shown in the figure.
2. Connect the other end of the DC cord to the DC OUTPUT jack of the AC adapter/charger.
3. Plug the AC adapter/charger power cord into an AC electrical outlet. Set the Operate switch on the AC adapter/charger to "I"; the POWER indicator will light.
4. After the AC adapter/charger has been used, set the Operate switch to "⏻". All the indicators on the AC adapter/charger will go out and the AC adapter/charger will enter the power standby mode. If you are not going to use the AC adapter/charger for a long time, unplug its power cord from the AC outlet.

See the bottom of the AC adapter/charger. The rating label is located on the bottom of the AC adapter/charger.

NOTES:

- This AC adapter/charger is universal for use with AC 110 — 240V around the world. If you use the camera/recorder in some foreign countries, an AC plug adapter (Not supplied) may be necessary.
- When using the AC adapter/charger to power the camera/recorder, the battery level indicator may display "▭". This indicator is used for battery operation and has no meaning when using the AC adapter/charger to power the camera/recorder.
- The AC adapter/charger cannot charge the battery and operate the camera/recorder at the same time.
  Remove the battery from the AC adapter/charger to supply power to the camera/recorder.

■ **WHEN USING WITH THE CAR BATTERY (By using optional car battery cord)**



1. Connect one end of the DC cord (provided) to the camera/recorder, as illustrated.
2. Connect the other end of the DC cord to DC OUTPUT of the car battery cord.
3. Connect the car battery cord to the car's cigarette lighter socket.

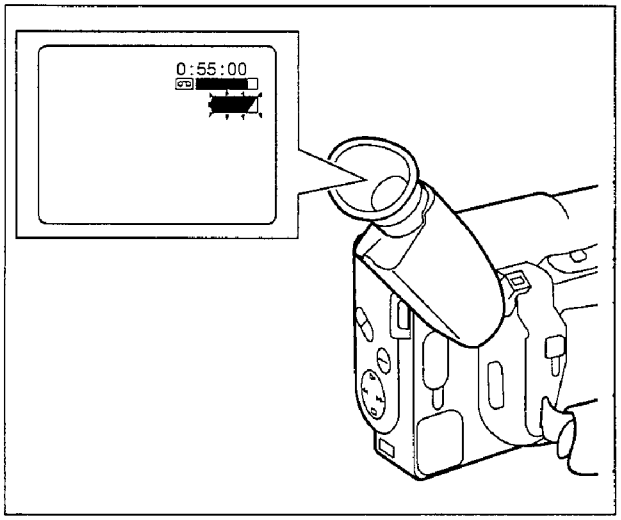
NOTES:

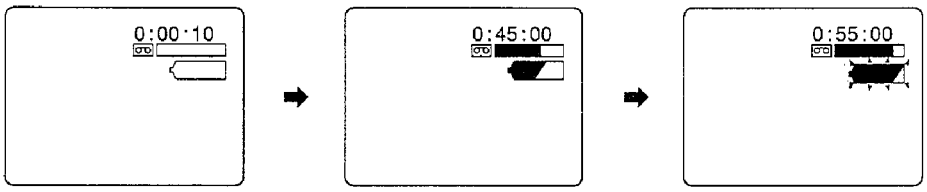
- The car battery cord is designed to be used only with automobiles having a 12/24-volt negative ground system.
- To prevent fire or shock hazard or damage to your camera/recorder, please use only the specified car battery cord.

CHECKING THE BATTERY PACK

When the " " indication appears in the viewfinder and flashes while the camera/recorder is operated with a battery pack (provided) or alkaline batteries, it indicates that the battery is insufficiently charged. Charge the battery pack or replace it with a charged battery pack or replace the alkaline batteries.

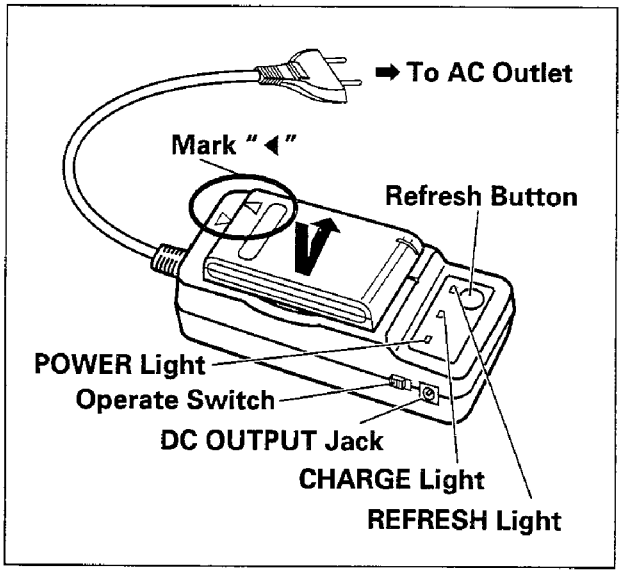
NOTE: When the camera/recorder is turned on, the battery level indicator " " is displayed in the viewfinder indicating the condition of camera/recording battery. When the battery is fully charged, " " is displayed.
After several minutes, the symbol will change to " ". When the battery is very near empty, the symbol will change to " " and start blinking. You should find an alternative power source or recharge the battery pack or replace the alkaline batteries before continuing to use your camera/recorder.





CHARGING THE BATTERY

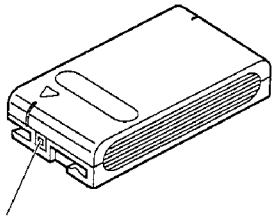
1. Plug the AC adapter/charger power cord into AC electrical outlet.
2. Attach the battery to the AC adapter/charger. Align the "◀" mark on the battery with that of AC adapter/charger and push the battery flush with the AC adapter/charger and slide it in the direction of arrow as shown in the figure.
   NOTE: You must remove the DC cord from the AC adapter/charger to charge the battery. If the DC cord is connected, CHARGE light will flash.
3. Set the Operate switch to "I". The POWER indicator will light and charging will start.
4. The CHARGE light will be lit while the battery is accepting a charge, and will go out when the battery is fully charged.
   NOTE: If you repeatedly charge a battery which is not completely discharged or leave a battery unused for a long time, the operation time of the battery will become shorter even when it is completely charged. In this event it is recommended that you refresh the battery before charging it.
   Attach the battery and then press the refresh button to refresh it. When refreshing is complete, the CHARGE indicator will light in place of the REFRESH indicator and charging will start automatically.
5. After charging is finished, set the Operate switch to "⏻". All the indicators on the AC adapter/charger will go out and the AC adapter/charger will enter the power standby mode. If you are not going to use the AC adapter/charger for a long time, unplug its power cord from the AC outlet.



To prolong the life of Ni-Cd batteries
- Only recharge batteries when they have completely discharged and the warning light ( ) is flashing.
- DO NOT top-up charge on batteries.

NOTES:
- The time required for charging the battery (provided) is approx. one hour.
- When fully charged, the battery should supply approx. 60 minutes of operating time (depending on how much you use zoom and pause).
- It takes about 4 hours to refresh a fully charged battery (provided).
- Charge the battery before use and store it at normal room temperature.
- The battery should be charged at a temperature of 10°C~30°C to prevent damage.
- Do not operate the battery at temperatures below –10°C or above 35°C. The battery may be damaged if operated at temperatures above 50°C. Operation time will decrease at extremely low temperatures.
- After repeated chargings and use, the operation time will gradually decrease. When operation time becomes too short to be useful, it is time to replace the battery.
- If the POWER light on the AC adapter/charger starts flashing, remove the battery and then reattach it. If after several attempts the POWER light continues to flash, this means your battery cannot take a charge and must be replaced with a new one.

The POWER light will also flash if a hot battery is attached to the AC adapter/charger. Attaching an extremely hot battery to the AC adapter/charger is not recommended; it should be allowed to cool down before being attached.
- Do not short the battery's terminal.
- Do not attempt to disassemble or modify the battery. There are no user serviceable parts inside.
- Throwing the battery into a fire or exposing the battery to excessive heat — over 65°C could be hazardous.
- Set the mark switch of any battery which has already been charged to red as shown in the figure. This lets you discriminate between charged and uncharged batteries easily.
  NOTE: The mark switch is not concerned with the battery's performance.

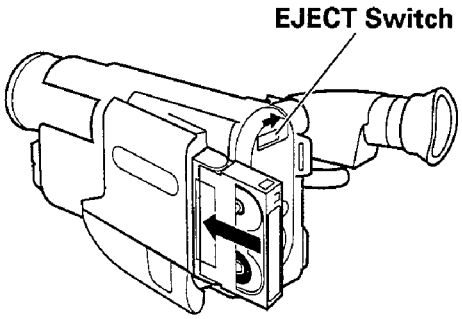


INSERTION AND REMOVAL OF CASSETTES

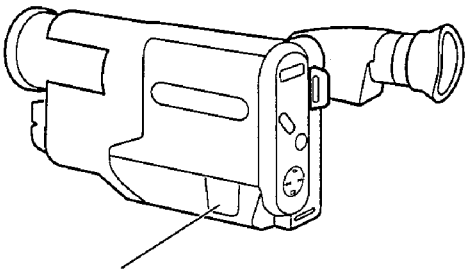
Before inserting or removing a cassette, be sure to connect the power source. When a power source is connected, the cassette can be ejected and removed whether the power is on or off.

■ **Insertion**

1. Slide the EJECT switch.
   The cassette door will open.
2. Insert a cassette so the transparent window is toward you and the arrow toward the cassette holder. Slide the cassette into cassette holder as far as it will go.



3. Press the cassette holder.
   Press the section of the holder marked "PUSH LOCK" until a click is heard.
   Be sure that you push the cassette holder marked "PUSH LOCK" to close the holder. Otherwise, the holder will not close and the tape may become slack which could lead to damage.



NOTE: If "TAPE" flashes in the viewfinder, remove the cassette and check that the tape is not damaged, is not slack or no dust adheres to it, etc. After making sure that there is no abnormality, reinsert the cassette. If "TAPE" reappears, see "TROUBLESHOOTING" on page 45.

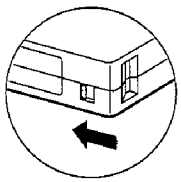
■ **Removal**

Slide the EJECT switch and remove the cassette.

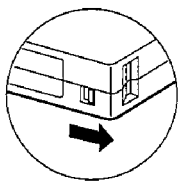
8 mm Video Cassette

An 8 mm Video Cassette has a record-protect tab on the side of the cassette that can be slid to prevent accidental erasure of recorded material.

To prevent accidental erasure, slide the record-protect tab in the direction of the arrow until the tab is completely visible.

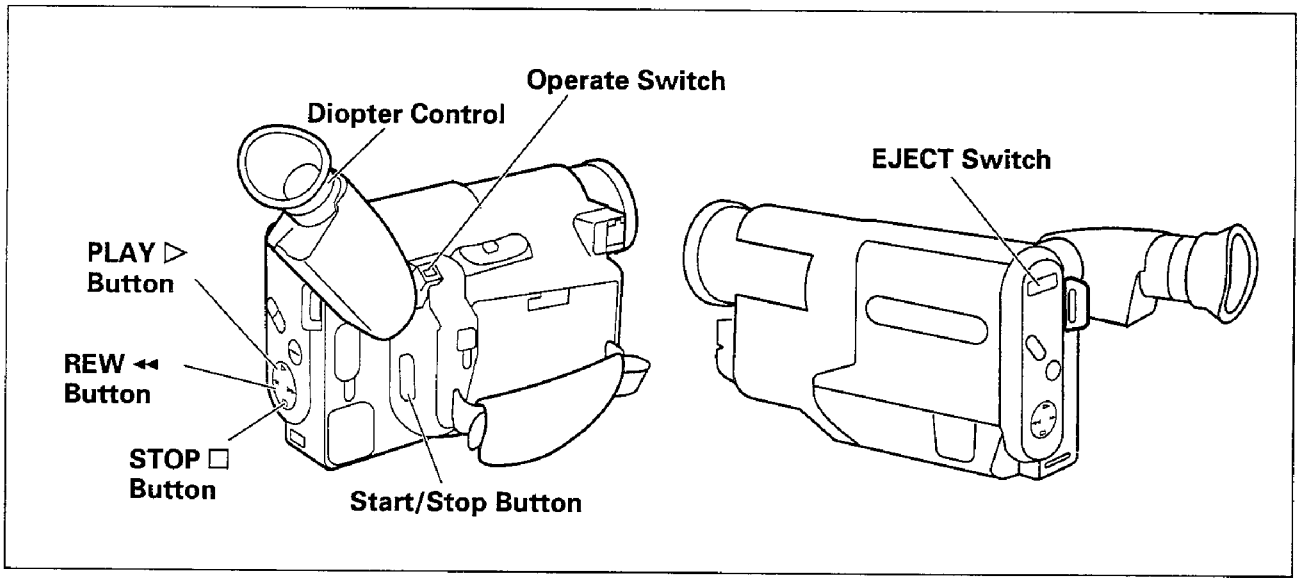


To record on the cassette again, slide the record-protect tab in the direction of the arrow. The tab will disappear behind the cassette case.



NOTE: After unpacking, it is recommended to fast forward tape to its middle and then rewind it before recording with the camera for the first time.

CAMERA RECORDING



1. Connect either one of the "POWER SOURCES" on pages 10 through 13.
2. Slide EJECT switch and insert the cassette.

   NOTE: If the power source is not connected to camera/recorder, the cassette holder will not open.
3. Press the cassette holder. The holder will latch in the operating position.
4. Slide Operate switch to "CAM". "**II**" appears and the camera/recorder will enter record/pause mode automatically.

   NOTE: If the record-protect tab on the cassette is closed, the "TAPE" indication in the viewfinder flashes for several seconds and the camera/recorder will not enter record/pause mode.
5. Adjust the diopter control so the display in the viewfinder can be seen most clearly.
6. Now, press Start/Stop button to start shooting the picture. You are now recording the picture you see through the viewfinder. The "REC" indication appears in the viewfinder instead of "**II**".
7. Press Start/Stop button to stop recording. Press the button again to resume recording. The "**II**" indication appears in the viewfinder instead of "REC" in the record/pause (stand-by) mode.

   NOTES:
   - The "TAPE END" indication in the viewfinder starts flashing when there is about three minutes recording time left on the cassette.

   - If the record/pause mode continues for more than 5 minutes, the camera/recorder's power is automatically turned off. To turn on again, press Start/Stop button. The camera/recorder enters record/pause (stand-by) mode.
8. After recording, slide Operate switch to "VIDEO", and the camera/recorder will be now in the stop mode.
9. Press REW button. The tape will be rewound to the beginning.
10. Press PLAY button. The picture you just recorded will be seen through the viewfinder.

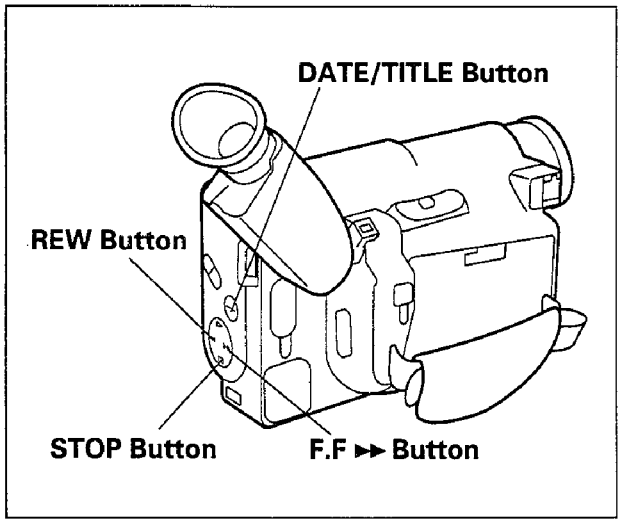
    NOTE: If you connect the camera/recorder to your TV, you can see the picture played back on your TV. Refer to "CONNECTIONS AND OPERATIONS FOR VIEWING THE PICTURE PLAYED BACK ON YOUR TV" on page 32.
11. After playing, press STOP button.
12. Slide Operate switch to "OFF" and then slide EJECT switch to remove cassette.
13. Always remove the power source from the camera/recorder after use.

NOTE: If you have a cassette tape that has already been partially recorded on and you want to record the remaining blank section, see "QUICK EDIT" on page 37.

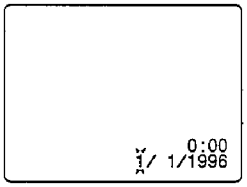
DATE/TIME SETTING

The date and time can be recorded on your tapes to act as a handy reference when viewing them at a later time. Use the following procedure to set up this display for the current date and time.
Make sure that the current time is displayed correctly before you start recording.

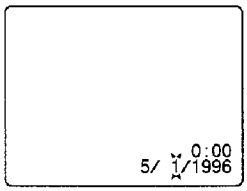
NOTE: Be sure to insert the clock battery before setting the date and time. Although the date and time can be set without the clock battery inserted, they will disappear when the battery providing power to the camera/recorder is removed.



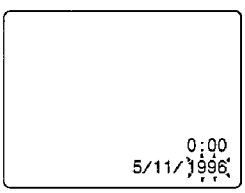
1. Slide the Operate switch to "CAM" while holding the small red button in the Operate switch down.
2. Press DATE/TITLE button.
   "0:00" and "1/1/1996" appears in the viewfinder and "1" flashes.



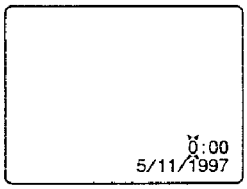
3. Press F.F button to select correct date. Hold button down to advance rapidly. If you go past the date you want to set, press REW button. When the correct date appears, press STOP button.



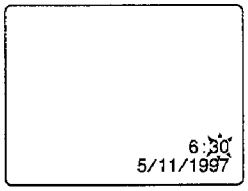
4. Press F.F button to select correct month.
   Hold button down to advance rapidly. If you go past the month you want to set, press REW button. When the correct month appears, press STOP button.



5. Press F.F or REW button to select year, and then press STOP button.



6. Press F.F or REW button to select correct hour, and then press STOP button.
7. Press F.F or REW button to select correct minute.



8. After setting to the correct minute, press DATE/TITLE button to change the display and start the internal clock.
   It is recommended that you press DATE/TITLE button to match the time signal.
   NOTE: After the date and time are set, "◷ AUTO" appears and the camera/recorder enters the automatic date recording mode. See "DATE RECORDING" on page 18.

■ To correct date/time after starting the date/time

1. Press and hold DATE/TITLE button, and then press STOP button. The date starts flashing.
2. Correct the incorrect digit by using F.F, REW and STOP buttons.

■ To correct date/time during programming

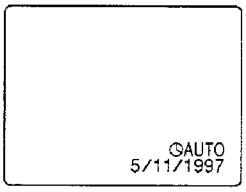
1. Press STOP button repeatedly until the digit that is incorrect flashes.
2. Correct the incorrect digit by using F.F, REW and STOP buttons.

DATE RECORDING

When the date has been set, the camera/recorder will enter the automatic date recording mode automatically.

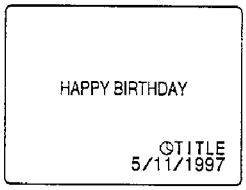
1. Press the red button on the CAM/OFF/VIDEO switch as you slide it to CAM.
2. Press the DATE/TITLE button to specify the date display you want to record.

◷AUTO and date – Automatic date recording
This option records the date automatically once a day at the beginning of recording for 10 seconds.



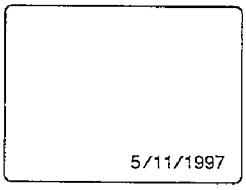
Note: The camera/recorder records the same date when:
– the cassette is replaced.
– you select ◷ AUTO and date display again.
– the recording is less than 10 seconds long.
Note: If the date changes while recording continues over 10 seconds, the new date is recorded for about 10 seconds the next time you make a recording.

◷ TITLE and date – Automatic title and date recording
This option records the date and created title (see "TITLE RECORDING" on page 28) automatically once a day at the beginning of recording for 10 seconds.

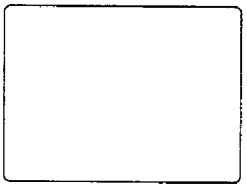


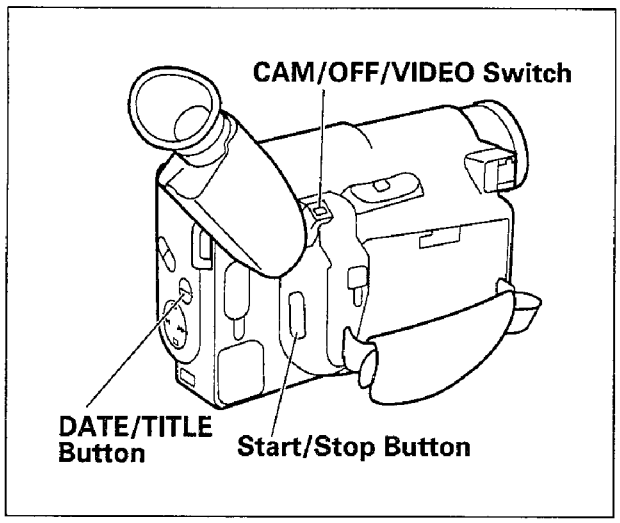
Note: When ◷TITLE is displayed in the viewfinder, the title cannot be turned on or off using the remote control.

Date – Date recording
The camera/recorder records the date with the picture all the time.

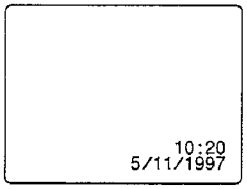


No display – No date recording
The camera/recorder does not record the date.





Date and time – Date and time recording
The camera/recorder records the date and time with the picture all the time.

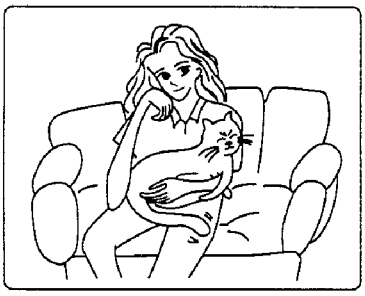


3. Press the start/stop button.
Recording will start.
Note: When ◷AUTO and date display selected, the date disappears about 10 seconds after recoding is started.
Note: When ◷ TITLE and date is selected, the title and date disappear about 10 seconds after recording is started.

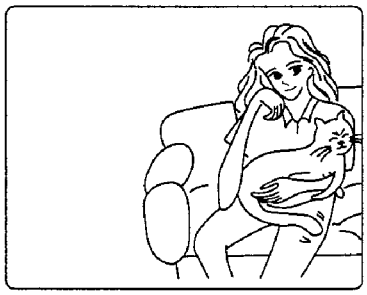
AUTO FOCUS

- You can always focus the object automatically if "FOCUS" is not displayed in the viewfinder.

- **The object at the centre of the viewfinder is in focus.**



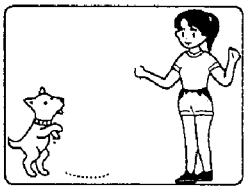
Good



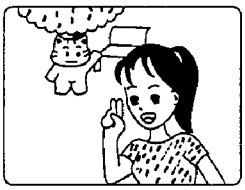
No good

The range of object with which auto focus can be used
- On "T" side : about 1m from the lens surface to infinity.
- On "W" side : about 1 cm from the lens surface to infinity.

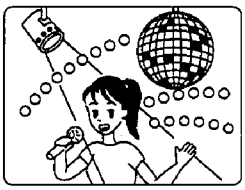
■ **You cannot focus automatically with the following objects. Focus manually.**



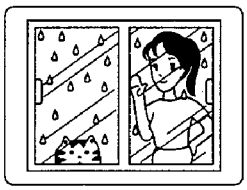
1. Objects not in the centre of the viewfinder.



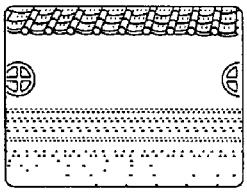
2. Objects at far and near positions at the same time.



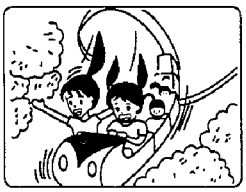
3. Objects lit by a spotlight or neon signs, etc.



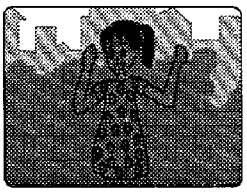
4. Objects behind glass with water droplets or dust on it.



5. Objects with almost no difference in brightness such as a white wall.



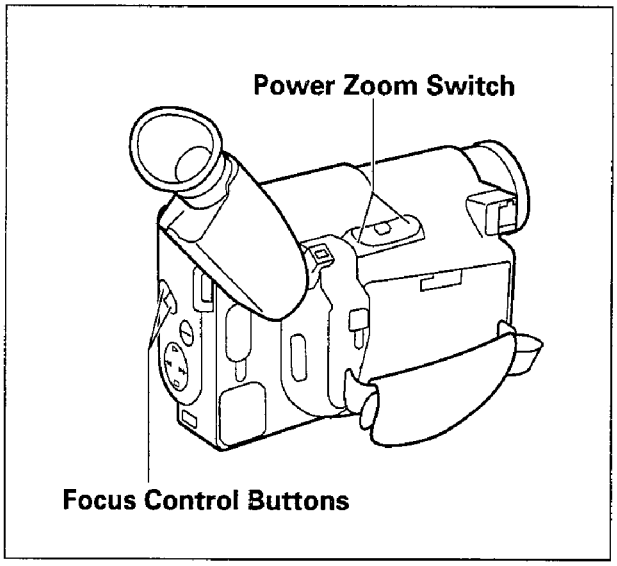
6. Objects moving rapidly.



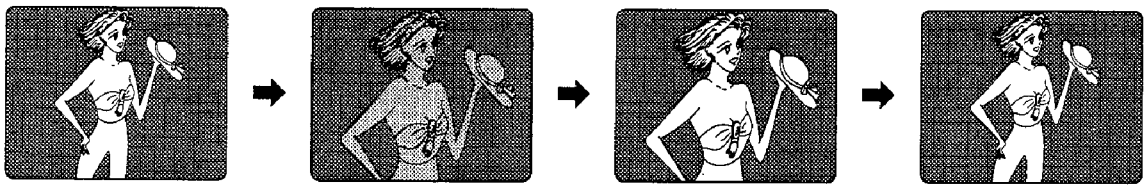
7. Dark objects

■ MANUAL FOCUSING

1. Press the FOCUS control buttons simultaneously to display "FOCUS" in the viewfinder.
   - When "FOCUS" is displayed in the viewfinder, you can adjust the focus manually.
   - When the FOCUS control buttons are pressed again, "FOCUS" disappears from the viewfinder and the camera returns to the auto focus mode.
2. Zoom in on the object by pressing the power zoom switch on the "T" side.
3. Press the FOCUS control F (far) or N (near) buttons to bring the subject into focus.
   NOTE: If focusing is performed without zooming up first, the picture may become out of focus when the zoom-up is done during actual picture taking.
4. Then, zoom back the object as desired.



NOTE: After using the manual focus, press the FOCUS control buttons simultaneously to switch off "FOCUS" in the viewfinder.



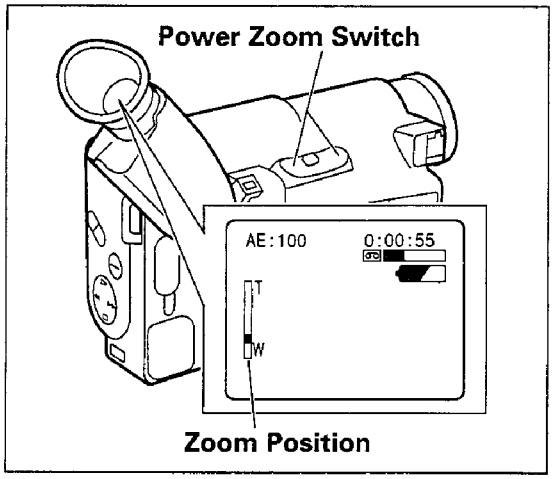
POWER ZOOM

- Press power zoom switch on the "W" side, and the picture gradually widens.

- Press power zoom switch on the "T" side, and the picture gradually becomes telescopic.

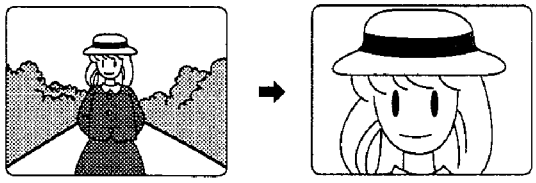
NOTES:

- If "ZOOM" appears in the viewfinder, the digital zoom function is engaged.
- When the power zoom switch is operated, the zoom position is displayed in the viewfinder for about 5 seconds and then disappears. The zoom position is displayed in 10 steps.



DIGITAL ZOOM (For VM-E220E/E420E)

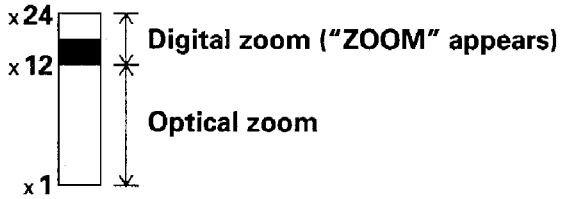
This feature allows you to increase the magnification of the image at the centre of the screen up to 2 times greater than the extreme telephoto position.



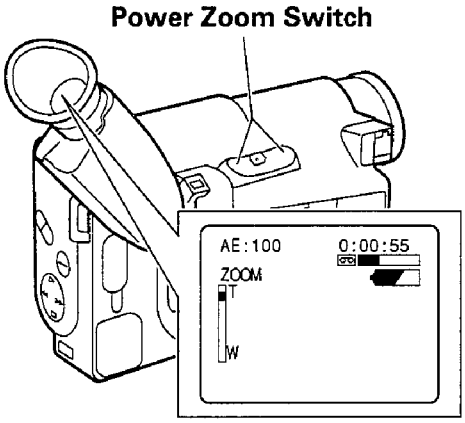
Press the "T" side of the power zoom switch and hold it ; "ZOOM" appears in the viewfinder and the digital zoom function is engaged.

NOTE: The digital zoom functions from the extremely telephoto position of X12.

- **Zoom area**



You can control the digital enlargement ratio by pressing the "T" or "W" side of the power zoom switch. When "ZOOM" is not displayed in the viewfinder, the normal zooming function is restored.



BEFORE YOU START TAKING PICTURES WITH YOUR DIGITAL ZOOM CAMERA/RECORDER

Digital zoom lets you really get close to the action. Due to the unique nature of this feature here are some important points to consider before you start:

As with all digital zoom camera/recorders picture clarity diminishes at high zoom ratios.

When you zoom in on your subject, at some point camera shake will become noticeable. As the zoom ratio becomes high, it is better to use a tripod.

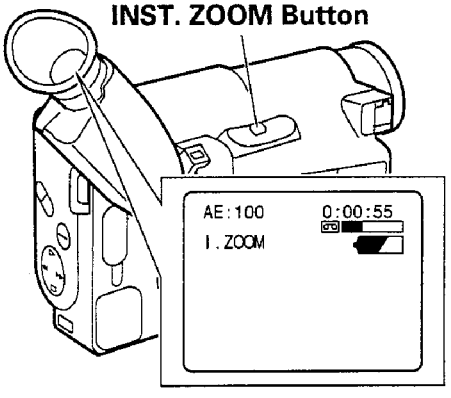
Since no two people will use their camera/recorders in exactly the same way, you should test the digital zoom feature by making a brief test tape at various zoom settings. So get comfortable with your new camera/recorder then go out and get close to the action.

INSTANT ZOOM

The instant zoom feature activates the digital zoom to magnify the subject being recorded 1.5 times momentarily regardless of the zooming engaged by the power zoom switch.

Press the INST. ZOOM button. "I.ZOOM" appears in the viewfinder and the subject is magnified 1.5 times. The instant zoom function only operates when "I.ZOOM" is displayed. To release instant zoom, press the INST. ZOOM button again so that "I.ZOOM" disappears from the viewfinder.

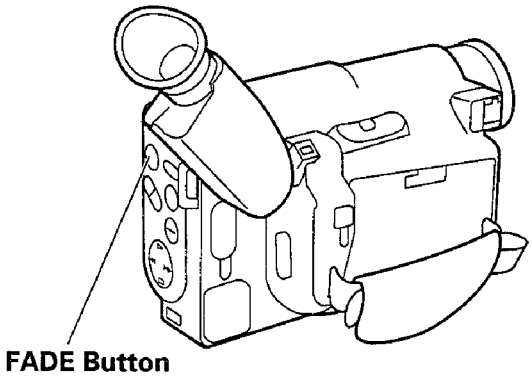
NOTE: When the instant zoom is used, the more the image is magnified, the rougher the picture becomes. Also even a slight shaking of the camera/recorder is conspicuous.



FADE-IN/FADE-OUT (Only for VM-E420E)

This feature lets you add a professional touch to your home recordings. When you fade into a scene, the recording will start with a blank scene and the picture will gradually appear. The picture gradually disappears when fading out. There are three fade modes.

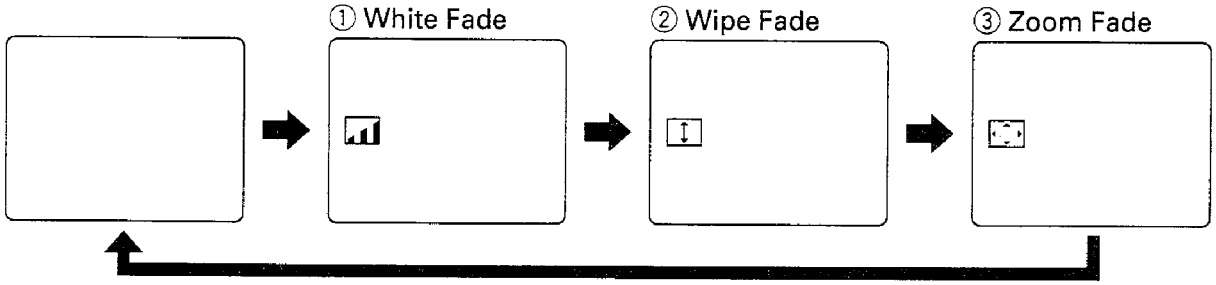
NOTE: When using FADE button, both picture and sound will gradually appear and disappear. The fade speed is automatically controlled by the camera/recorder.



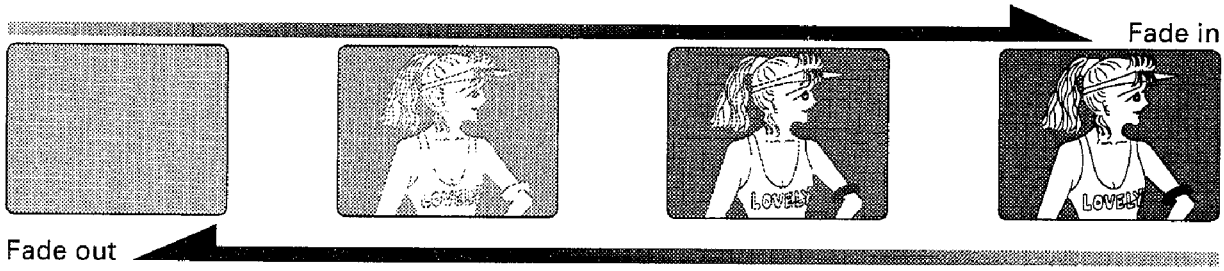
(VM-E420E)

■ To select the fade mode

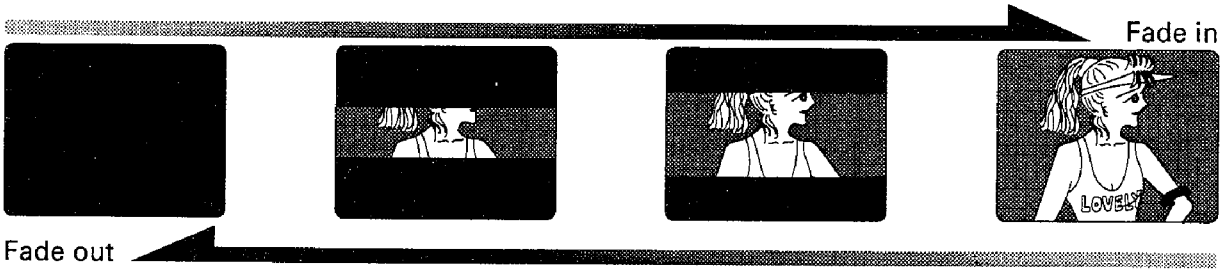
Each time the button is pressed, the FADE mode is switched and displayed in the viewfinder. The last mode selected will appear first.



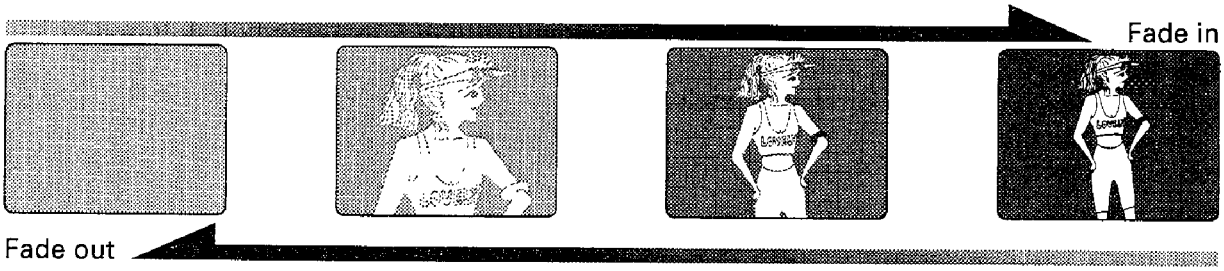
① White Fade (fading in/out, from/to a white picture)



② Wipe Fade (fading in/out, from/to a black picture)



③ Zoom Fade (fading in/out while zooming)



■ **FADE-IN**

1. Press the FADE button before recording to select the fade mode.
2. Press the Start/Stop button to start recording.
   - The picture fades in automatically and recording starts.

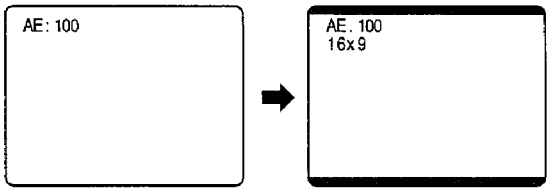
■ **FADE-OUT**

1. While the camera/recorder is recording, press the FADE button to select the fade mode.
2. Press the Start/Stop button to stop recording.
   - The picture fades out automatically and "REC" flashes until the fade ends then recording stops.

NOTE: When fading out be sure to wait until the PAUSE indicator (⏸) is visible in the viewfinder before attempting to put the camera/recorder into the record mode again.

16x9 MODE (Only for VM-E420E)

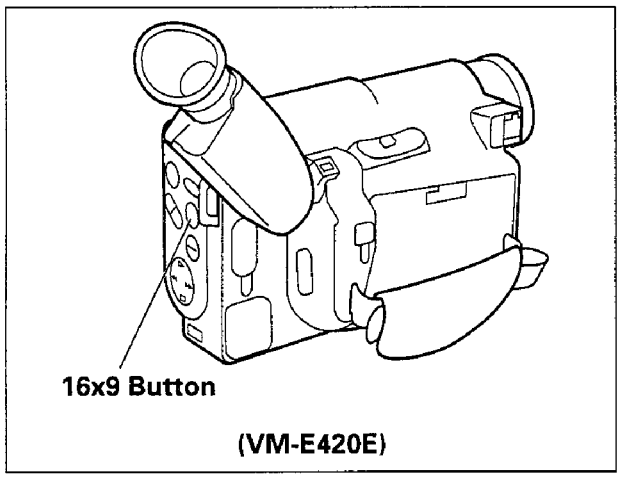
Pressing the 16x9 button during recording or recording pause fades the top and bottom of the picture in the viewfinder to black.



- "16x9" is displayed in the viewfinder.
- When the 16x9 button is pressed again, "16x9" disappears and the normal picture is restored.

NOTES:

- It may be difficult to see the black bars at the top and bottom of the viewfinder.



(VM-E420E)

ELECTRONIC IMAGE STABILIZER (EIS) (Only for VM-E420E)

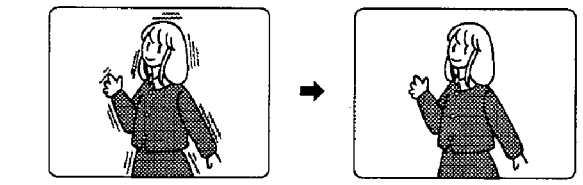
This function corrects slight shaking of the image in the following record modes.

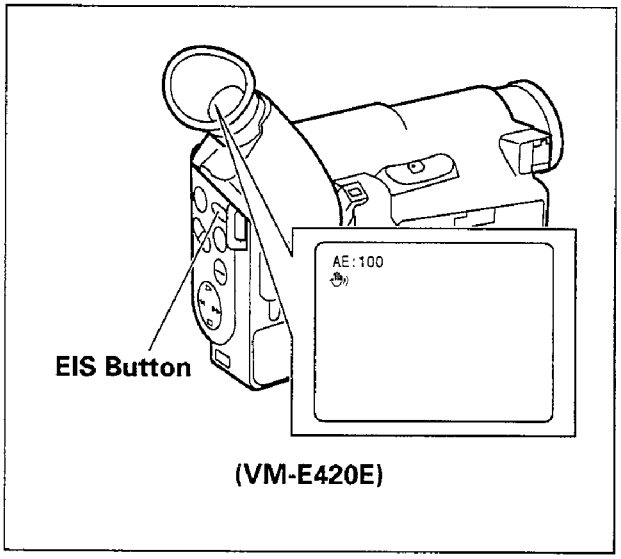
- Recording by zooming up to a distant subject
- Recording by approaching a small subject
- Recording while walking around
- Recording a subject behind the window of a vehicle

1. Press the EIS button to engage the electronic image stabilizer and to display the EIS indicator " ".
   - Press the button again to switch off this function.
2. Press the Start/Stop button to start recording.
   - EIS corrects slight shaking of the image when " " is displayed.

NOTES:

- Shaking of the image appears in the viewfinder with a slight delay.
- EIS may not operate correctly when a wide or teleconverter lens is used.
- When the EIS function is engaged in the vicinity of the zoom range with "ZOOM" displayed in the viewfinder and the zoom is moved from the wide-angle end, the image size will change, but this is normal.
- When the EIS function is engaged, the picture becomes rough.
- When the EIS function is engaged, the angle of view at the wide-angle end becomes narrower.
- It is recommended that you do not use the EIS function when using a tripod. The sensor would detect vibrations from the tripod in which case the picture would be blurred.



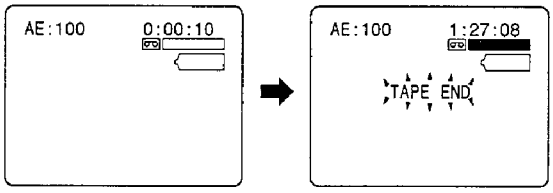


(VM-E420E)

REMAINING TAPE

The tape remaining display shows the remaining tape that can be used for recording and playback in the viewfinder using bars.

Insert a cassette into the camera/recorder; "⊡ ------" appears in the viewfinder. 10 seconds after recording or playback is started, the remaining tape will be displayed. The display will appear when a cassette is loaded, and it will disappear when the cassette is ejected.

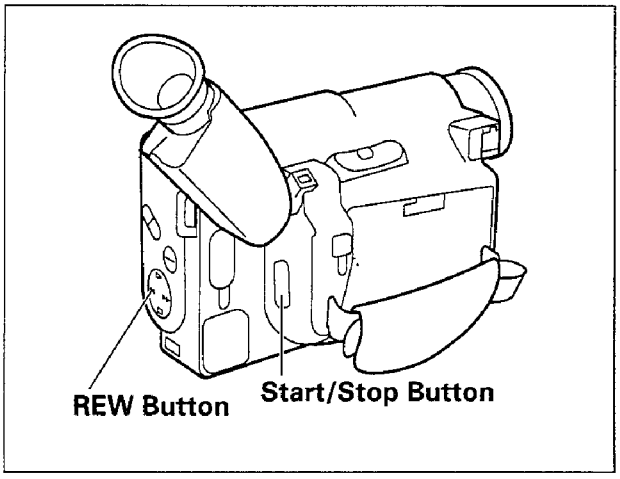


NOTES:

- The maximum tape remaining is displayed by the 7 bars as shown below regardless of the recording time of the cassette being used. The remaining tape per bar is different for different cassettes.
- The tape remaining display appears 10 seconds after the tape starts to run.
- The "TAPE END" indication in the viewfinder starts flashing when there is about three minutes recording time left on the cassette.

INSTANT REVIEW

1. In record/pause (stand by) mode, tap REW button, and the recorded scene of the last few seconds is played back in the reverse direction and then played back in the forward direction.
2. When the tape reaches the end of the scene you have just recorded, the camera/recorder returns to the record/pause (stand by) mode. Recording starts again when the Start/Stop button is pressed again.

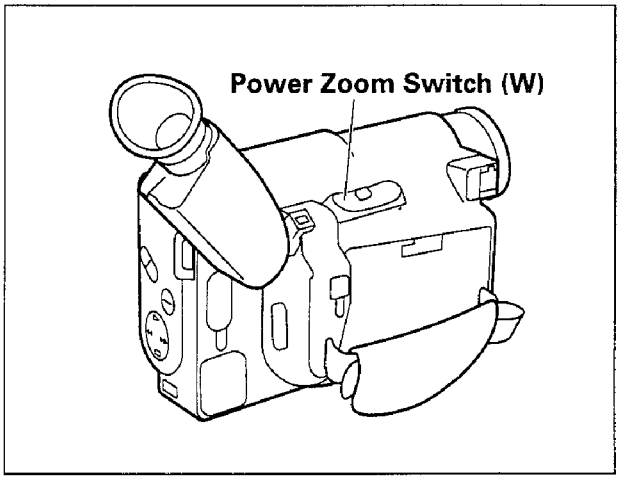


MACRO

It permits you to shoot objects as close as 1 cm from the lens tip.
Press and hold "W" side of power zoom switch. An object is auto focused.

NOTES:

- Determine the size of the object by moving the camera backward and forward.
- Be careful as the lighting tends to be low when shooting in the above conditions.
- A subject 1m from the lens surface to infinity can be focused on the telephoto side.

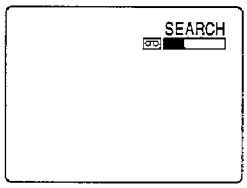


DATE SEARCH

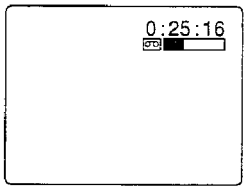
The date search function memorizes the start and end positions of recordings you made on a specific day so you can easily locate those positions later as long as the cassette is left in the camera/recorder.

NOTE: Be sure that the date and time are set.

1. Attach a power source and slide the Operate switch to "VIDEO".
2. Press the DATE/TITLE button (the DISPLAY button on the remote control) to display "SEARCH" in the viewfinder.



3. Press the REW button to search for the start position from which you last made a recording or the F.F button (the F.FWD button on the remote control) to recording end position.
4. When the required position is located, the camera/recorder enters the stop mode and "SEARCH" disappears from the viewfinder.



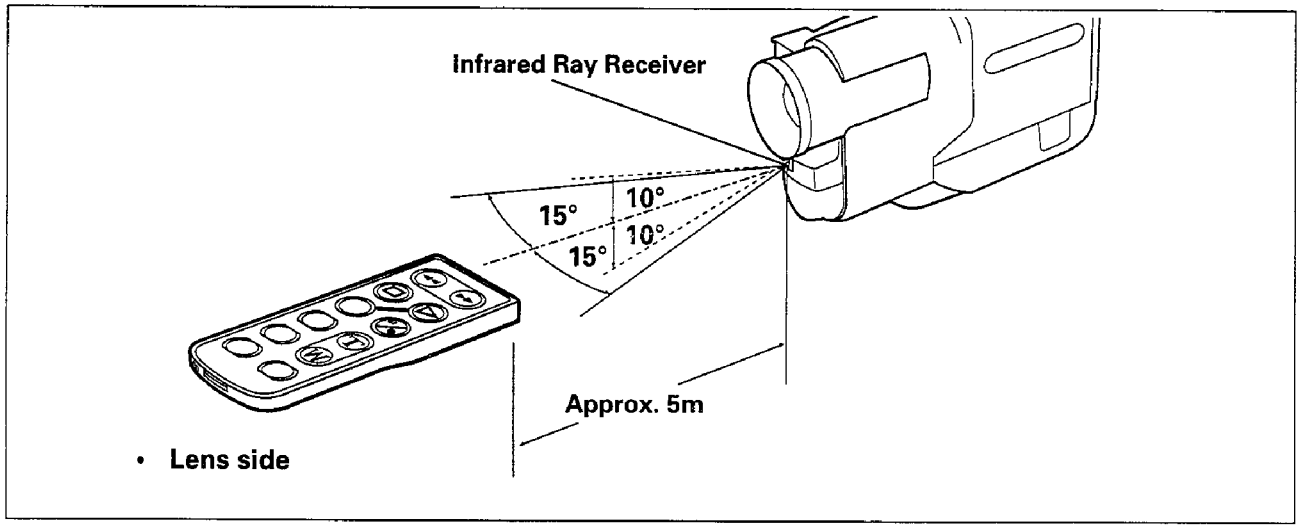
NOTES:

- If you have ejected the cassette, this function will not operate with that cassette. (When a cassette is inserted and the recording is started, the position is identified as the recording start position on that day.)
- If the clock battery is not inserted, the date search function does not operate when the battery providing the power to the camera/recorder is removed.
- When the cassette was recorded by another camera/recorder, the date search function does not operate.
- The date search function is released when you press the STOP button during date search mode.
- If the recorded time is less than 30 seconds, the date search function may not operate normally.

WIRELESS REMOTE CONTROL

You can operate the camera/recorder with the wireless remote control (provided) from a distance. The buttons on the remote control except for A/V DUB, DISPLAY, COUNTER RESET, TITLE ON/OFF and S.EDIT have the same functions as the buttons with the same identifications on the camera/recorder. Aim the remote control at the receiver of the camera/recorder.

■ **Remote controllable range**



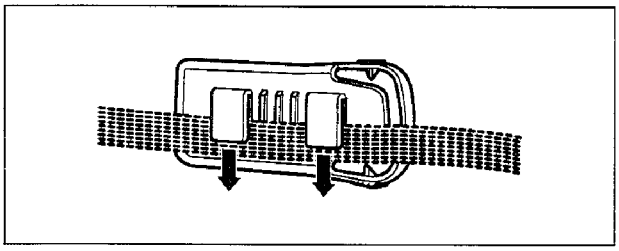
Cautions on the remote control

- Use the remote control indoors. When the infrared ray receiver is exposed to direct sunlight or strong light such as that from artificial lighting, the remote control may not operate correctly.
- The remote control cannot be operated if there is an obstacle between the remote control and infrared ray receiver.
- The remote control code of this camera/recorder is "VCR2". If the remote control code of your VCR is the same, "VCR2", your VCR may malfunction when this remote control is used.

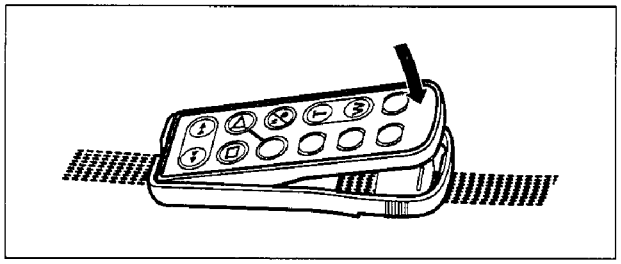
■ **How to attach the remote control to the shoulder strap (Only for VM-E420E)**

It is recommended that you fit the remote control into the holder and attach the holder to the shoulder strap so as not to lose the remote control and for convenience when shooting outdoors.

1. Attach the holder to the shoulder strap.

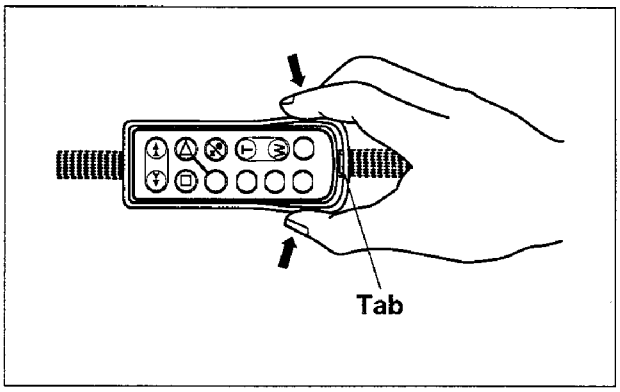


2. Attach the remote control to the holder.
   Fit the remote control into the holder as shown in the figure below and push the control in the direction of the arrow until a click is heard.



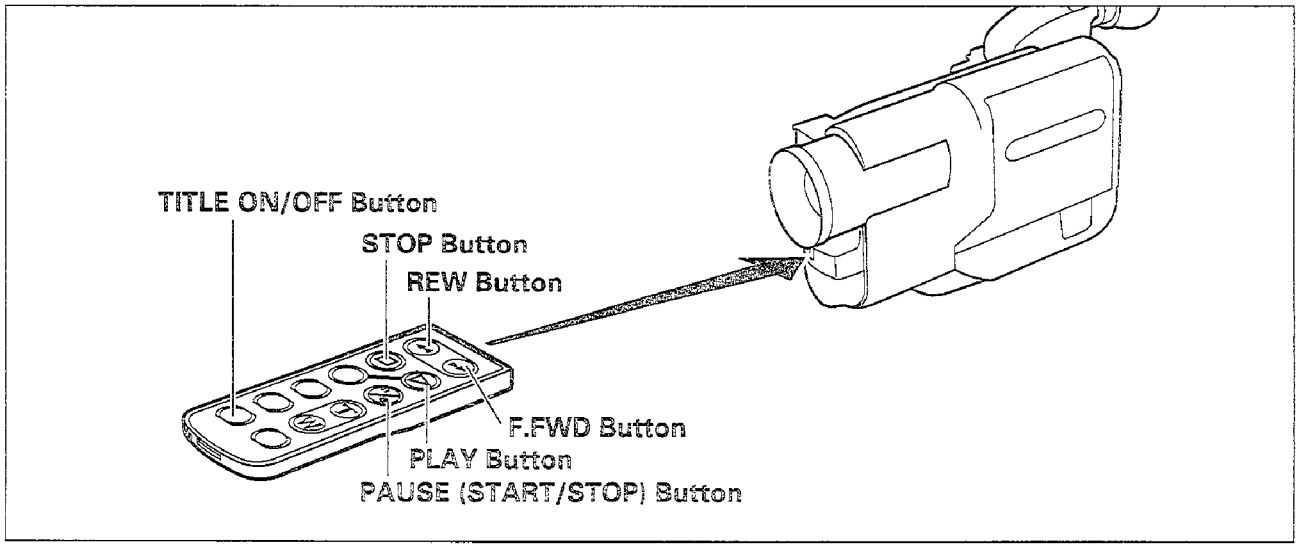
■ **To remove the remote control**

Push both sides of the holder until the remote control is released from the tab. The rear of the remote control will be released from the holder and will lift slightly.



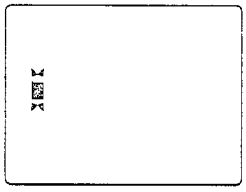
TITLE RECORDING

You can easily create a personalized title and record it on your videos with the camera/recorder's built-in titler.
Once a title is stored, it can be displayed and recorded at anytime. A title page can contain two lines of 16 characters each.
The titler contains 47 different characters for creating a title.
When creating and recording a title, use the TITLE ON/OFF button on the remote control. The DATE/TITLE button on the camera/recorder can also be used to create a title in the camera mode.
NOTE: Be sure to insert the clock battery before creating a title. Although a title can be created without the clock battery inserted, it will disappear when the battery providing power to the camera/recorder is removed.



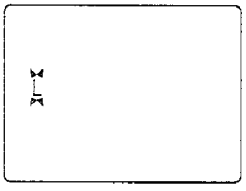
Creating a title

1. Press TITLE ON/OFF button on the remote control. The flashing cursor will appear in the viewfinder.

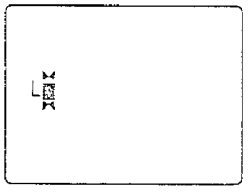


2. Press STOP button repeatedly to move the flashing cursor to the place you want to begin your title.
3. Select the first character for your title by pressing the REW or F.FWD button repeatedly until the desired character appears.

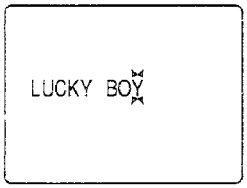
   NOTE: A title can contain up to two lines of 16 characters each. A chart showing the characters contained in the registers is located on the right.



4. After you have selected the first character, press STOP button to move the flashing cursor to the place you want the next character.



5. Repeat steps 3 and 4 until you have completed the title.



   NOTE: Character may flash, however it will be recorded correctly without flashing.
6. After creating the title, press TITLE ON/OFF button on the remote control to remove the title graphics from the viewfinder. Now title graphics are stored in memory.
   Note: As long as the correct current time can be displayed, the title is held in memory.

Correcting errors during programming

1. Press STOP button repeatedly until the character to be corrected flashes.
2. Press either REW or F.FWD button until the correct character appears.

NOTE: The corrected character may flash, however it will be recorded correctly without flashing.

Chart of characters available in the titler

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	0	1	2	3	4	5	6	7	8	9
?	'	.	/	,	-	;	:	<	>	!							

■ **Recording a title on a tape in the camera/ recorder**

1. Slide Operate switch to "VIDEO".
2. Locate the position on the tape that you wish to record the title.
3. Slide Operate switch to "CAM".
4. Press TITLE ON/OFF button on the remote control to display the title graphics.
5. Press Start/Stop button to start the title recording.
6. Press TITLE ON/OFF button on the remote control to remove the title graphics from the viewfinder.
   The camera/recorder will now record as normal.

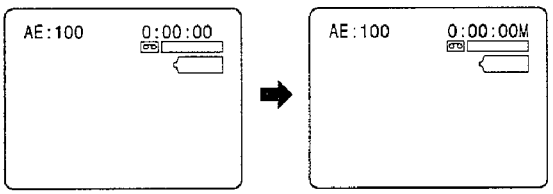
■ **Recording a title on another VCR while playing a tape back with the camera/recorder**

1. Connect the camera/recorder and VCR.
   (See page 38.)
2. Set the VCR in the recording mode and camera/ recorder in the playback mode.
3. Press TITLE ON/OFF button on the remote control when you see the scene where you want to record the title.
4. Press TITLE ON/OFF button on the remote control to erase the display from the viewfinder.

DISPLAY BUTTON

When the DISPLAY button on the remote control is pressed, the displays in the viewfinder will change as follows.

- When a recorded tape is in the camera/recorder during the recorder mode, "SEARCH" appears in the viewfinder. (Refer to "DATE SEARCH" on page 26).



Linear time counter

(cannot be monitored on the TV)

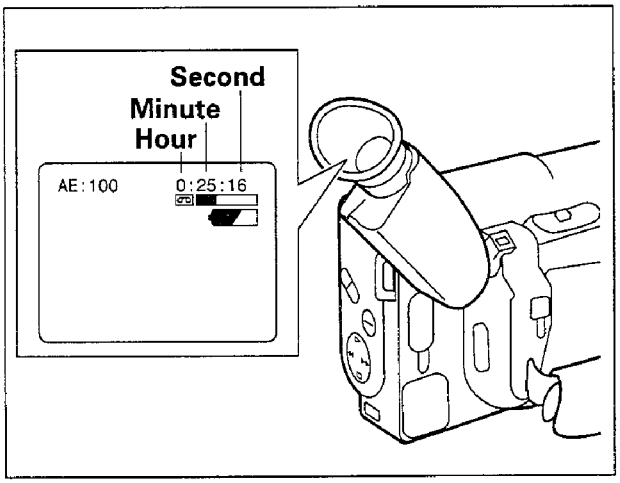
Linear time counter with memory

(can be monitored on the TV)

LINEAR TIME COUNTER

Shows length of tape run in hours, minutes and seconds.
When the camera/recorder is turned on, the linear time counter appears in the viewfinder.
Load a cassette into the camera/recorder and perform recording or playback; the counter indicates the elapsed time. Press the COUNTER RESET button on the remote control to reset the counter to "0:00:00".

NOTE: Counter changes to "0:00:00" when cassette is ejected.

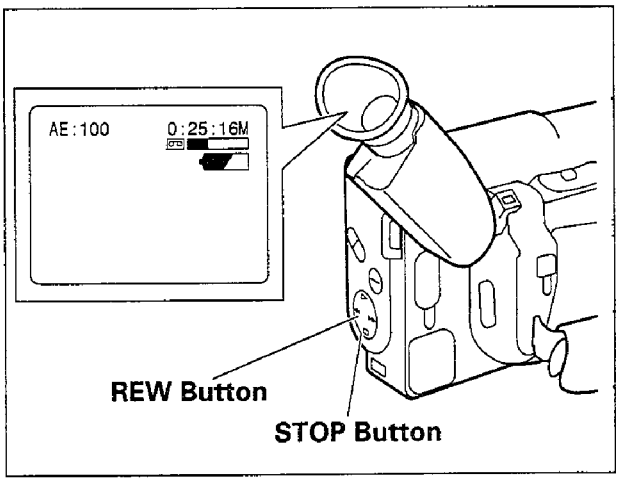


MEMORY

When the linear time counter with memory indication appears in the viewfinder, a tape that is being rewound automatically stops when the counter reads approximately "0:00:00M". This is useful if there is a section of tape you want to review immediately after recording or if you want to return to the same point several times in a row.

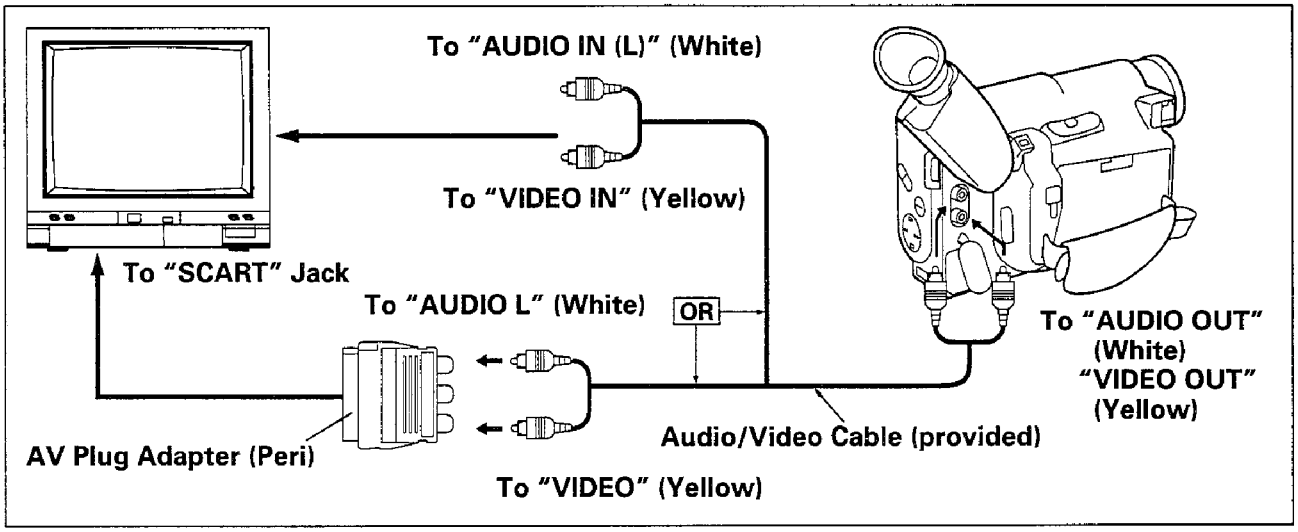
1. Press DISPLAY button on the remote control until the linear time counter with memory is displayed.
2. Start playing or recording a tape.
3. At the point you want playback to start, press COUNTER RESET button on the remote control to reset the counter to "0:00:00M".
4. Continue to play or record.
5. Press STOP button to stop playback, or press Start/Stop button to stop recording and set Operate switch to "VIDEO".
6. Press REW button. The tape will be rewound to the preselected point, at approximately "0:00:00M" indication.

NOTE: The tape will also stop approximately at "0:00:00M" during fast forward mode.



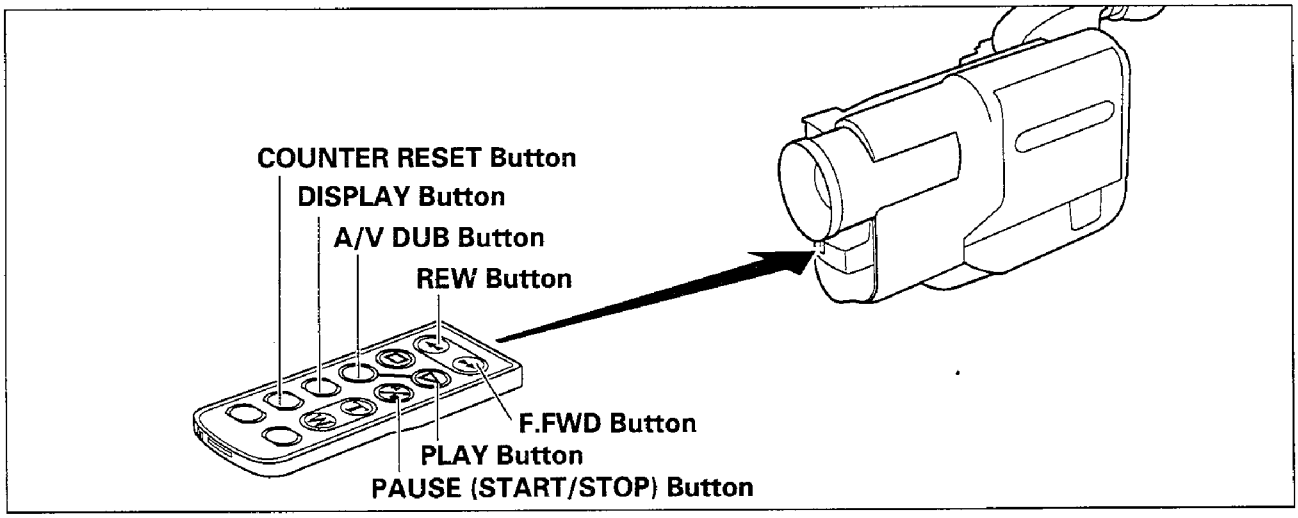
AUDIO/VIDEO DUBBING

Audio/video dubbing lets you record new audio and video from the camera/recorder's built-in microphone and camera onto the tape in the camera/recorder.



NOTES:
- If your TV has "AUDIO/VIDEO IN", connect the cable directly to the TV.
- If your TV has two (stereo) audio inputs, connect the audio plug to the left-channel audio input on the TV.
- If your TV has "SCART" jack, connect the audio/video cable to the AV plug adapter, and then connect the adapter to the SCART jack of your TV.
- When the audio/video dubbed portion is played back, noise may appear at the end of the dubbed portion.
- If the camera/recorder is in AV DUB pause or STILL mode for more than 5 minutes, the camera/recorder stops automatically to protect the tape.
- Automatic date recording is disabled during audio/video dubbing.

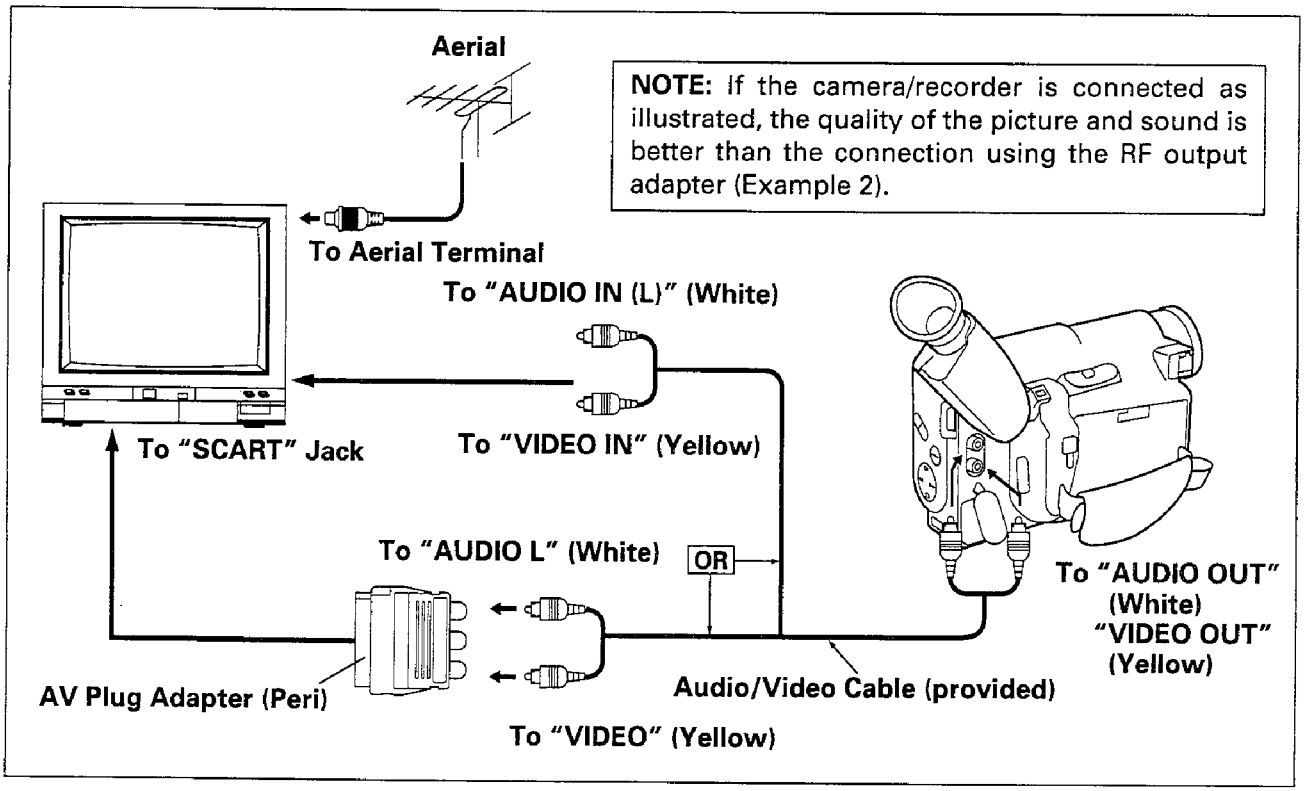
1. Insert a recorded tape.
   Be sure that the record-protect tab is not closed.
2. Slide Operate switch to "VIDEO".
3. Aim the remote control at the receiver on the camera/recorder.
4. Press PLAY button and then REW or F.FWD button to search to the approximate area on the tape where you want to begin your dub.
5. Press PLAY button again to search for the exact position that you want to stop dubbing and then press PAUSE (START/STOP) button.
6. Press DISPLAY button so that the linear time counter with memory appears and then press COUNTER RESET button to set the counter reading to "0:00:00M".
7. Press REW button to rewind the tape to the approximate position that you want to start dubbing.
8. Press PLAY button, and when the exact position that you start to dub is reached, press PAUSE (START/STOP) button.
9. Press and hold the A/V DUB button, and then press the PLAY button."A/V DUB ❚❚" appears in the viewfinder, and at the same time the picture to be dubbed appears.
10. Press PAUSE (START/STOP) button.
    "A/V DUB" will appear in the viewfinder and A/V dubbing will start. A/V dubbing will stop when the counter reads "0:00:00M".



CONNECTIONS AND OPERATIONS FOR VIEWING THE PICTURE PLAYED BACK ON YOUR TV

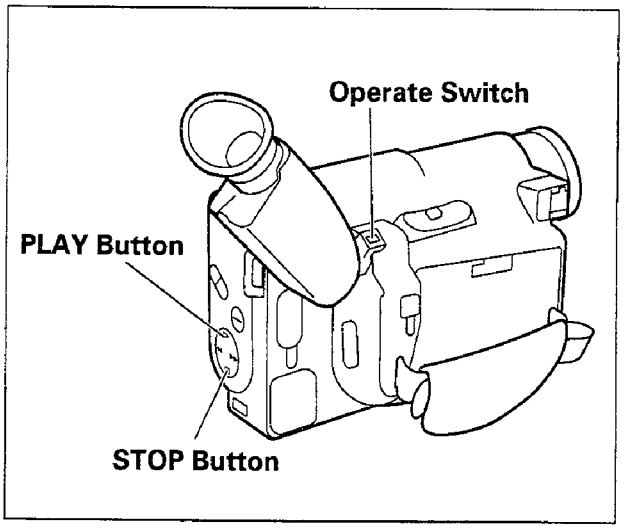
To play back a tape recorded on your camera/recorder and view it on your TV receiver, you must connect the camera/recorder to the TV receiver using either audio/video cable or RF output adapter.

Example 1: If your TV has SCART jack or AUDIO/VIDEO IN jacks,

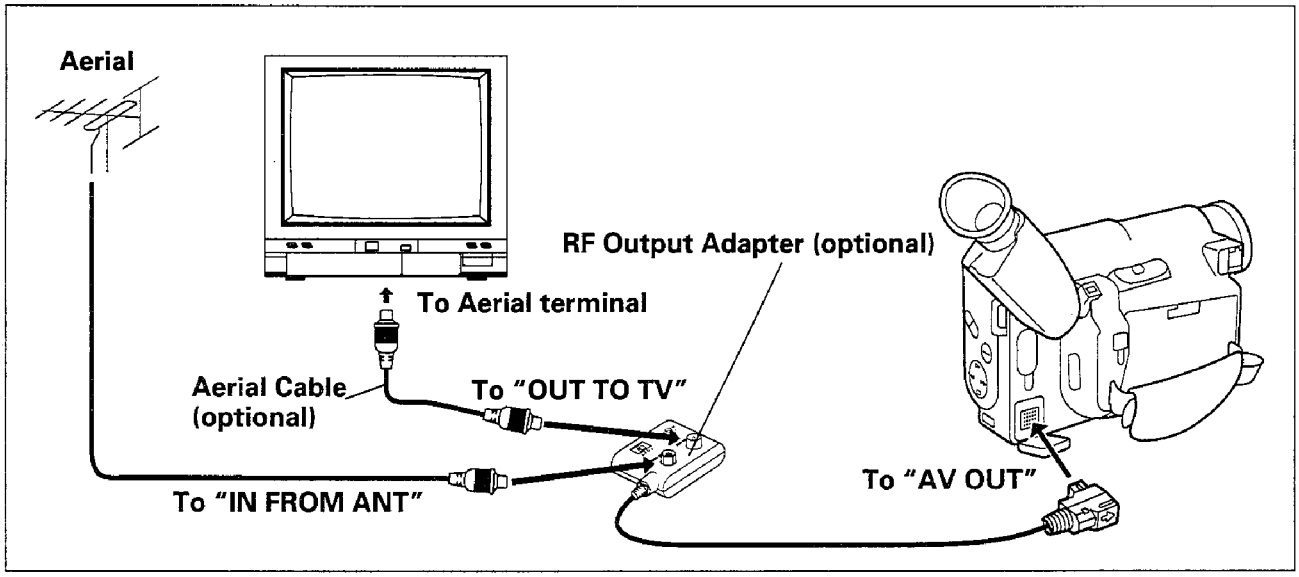

Aerial
NOTE: If the camera/recorder is connected as illustrated, the quality of the picture and sound is better than the connection using the RF output adapter (Example 2).
To Aerial Terminal
To "AUDIO IN (L)" (White)
To "SCART" Jack
To "VIDEO IN" (Yellow)
To "AUDIO L" (White)
OR
To "AUDIO OUT" (White)
"VIDEO OUT" (Yellow)
AV Plug Adapter (Peri)
Audio/Video Cable (provided)
To "VIDEO" (Yellow)

1. Connect the TV and camera/recorder as illustrated above.

   NOTE: If your TV has two (stereo) audio inputs, connect the audio plug to the left-channel audio input on the TV.
2. Turn on TV and select video input.
3. Insert the cassette.
4. Slide Operate switch to "VIDEO".
5. Press PLAY button.
6. After playing press STOP button.



Example 2: If your TV is a regular TV,



1. Remove the antenna cable from your TV set. Connect this cable to "IN FROM ANT" on the RF output adapter.
2. Connect the Aerial cable to "OUT TO TV" on the RF output adapter.
3. Connect the other end to aerial terminal on your TV.
4. Connect the connector cable from RF output adapter to "AV OUT" on the camera/recorder.
5. Turn on the TV and select an unused channel (CH37). Refer to "VIDEO CHANNEL SETTING" below.
6. Perform same procedures in steps 3 through 6 of "Example 1" on page 32.

NOTE: With this connection, the output sound is monaural.

NOTE: If you want to watch a TV programme with camera/recorder connected as illustrated, slide Operate switch of the camera/recorder to "OFF".

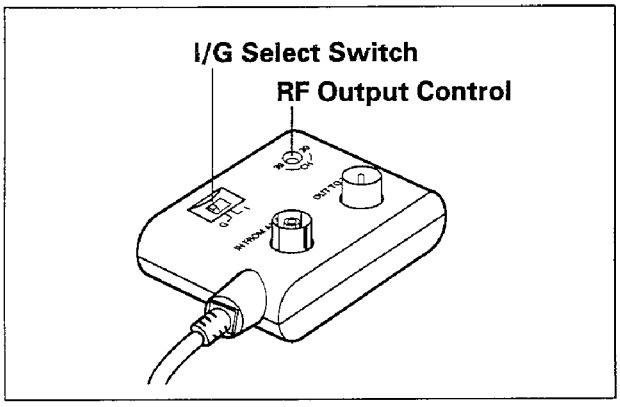
VIDEO CHANNEL SETTING

When viewing the picture played back by the camera/recorder on your TV, change over the I/G select switch of the RF output adapter matching your TV as well as to select the video channel on the TV.

1. Connect TV, RF output adapter and camera/recorder. (See above)
2. Set I/G select switch on RF output adapter as follows.

Colour TV broadcast system in your country	Position of I/G Select Switch
PAL (System I)	I
PAL (System B & G)	G

3. Turn on TV and select an unused channel (CH37). (In some cases this may be marked A/V.)
4. Insert the recorded tape to camera/recorder.
5. Slide Operate switch to "VIDEO".
6. Press PLAY button of camera/recorder. Now playback picture appears on your TV. If the playback picture is not clear or channel 37 is used for broadcasting in your area, adjust the RF output control of RF output adapter using a small screwdriver and readjust your TV until the playback picture is clearly observed.



AV OPTICAL LINK (Only for VM-E420E, the AV optical receiver is optional)

This system converts the signals picked up from the tape into infrared signals and transmits them to the AV optical receiver to play back the picture and sound on a TV which is not physically connected to the camera/recorder. This system cannot be used when the camera/recorder is in the camera mode and A/V dubbing mode.

NOTE: Only the VM-IR20E optical receiver (optional) can be used with this camera/recorder as an optical link.

Cautions when using the AV optical receiver

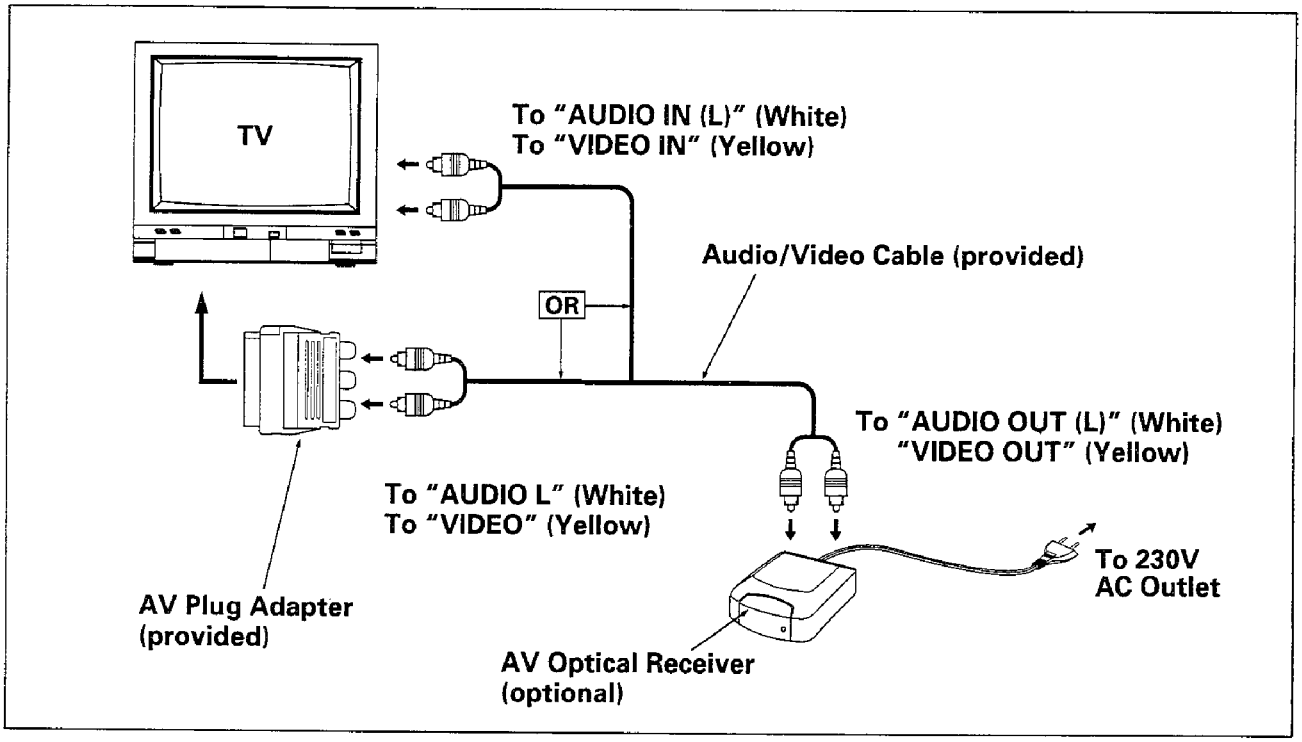
- Be sure not to install the AV optical receiver in a place exposed to direct sunlight or near a heater where the temperature becomes very high, or the receiver could malfunction.
- Do not install the receiver in an unstable place, in a place subject to vibrations or on a place of a device such as a TV where it becomes warm.
- Use the receiver at normal temperatures (5°C ~ 35°C).
- Take care not to drop the receiver or apply a shock to it.
- Do not leave the optical receiver hanging in the air.

If any abnormality or trouble occurs:

- If you find any abnormality or trouble, immediately unplug the power cord from the AC outlet and consult the video store from whom you purchased the camera/recorder.
- When you go for servicing, take both the AV optical receiver and camera/recorder.

See the bottom of the AV optical receiver. The rating label is located on the bottom of the AV optical receiver.

■ CONNECTION



NOTES:

- If your TV has the "AUDIO/VIDEO IN" jacks, connect the audio/video cable directly to the TV.
- If your TV has the "SCART" connector, connect the audio/video cable to the AV plug adapter, and then connect the adapter to the SCART connector of your TV.
- If your TV has two (stereo) audio inputs, connect the audio plug to the left-channel audio input on the TV.

1. Connect the AV optical receiver to the TV using the audio/video cable as illustrated above.
2. Plug the power cord into an AC outlet. The power lamp of the optical receiver will light (red) to show that the receiver is in the power on mode.

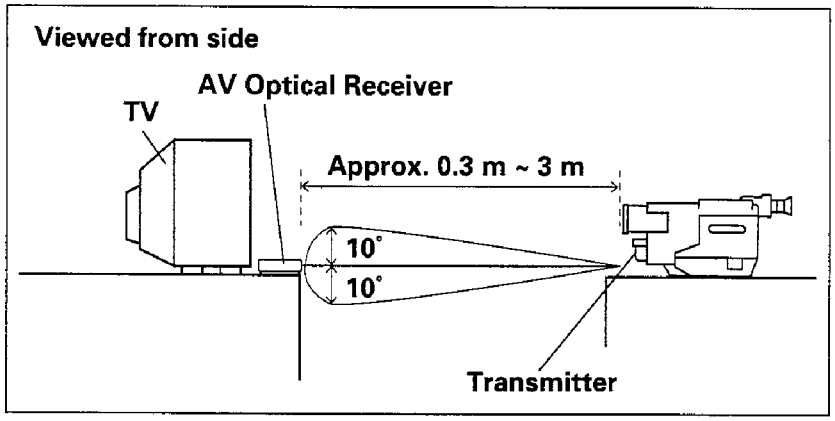
NOTES:

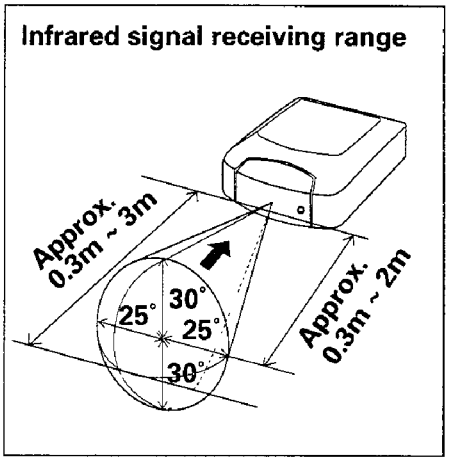
- Use the optical receiver with the 230V AC power supply.
- If you are not going to use the AV optical receiver for a long time, unplug the power cord from the AC outlet.

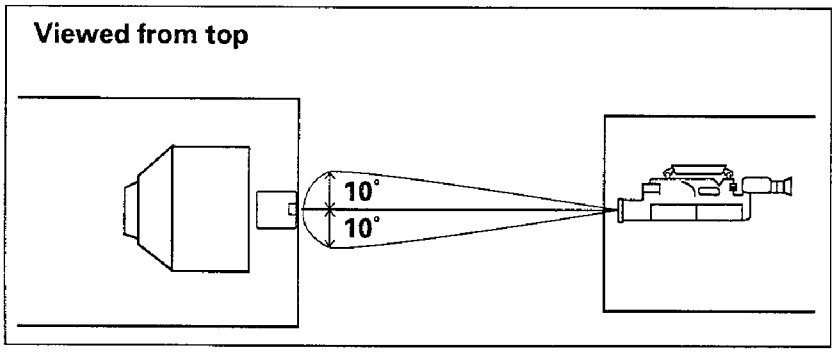
■ OPERATIONS

1. Make sure that the power lamp of the AV optical receiver lights (red) to show that the receiver is in the power on mode.
2. Turn the TV on and select video input.
3. Connect a power source to the camera/recorder and insert a recorded cassette.
4. Set the Operate switch to "VIDEO" and point the camera/recorder's transmitter at the AV optical receiver.
   NOTE: When the Operate switch of the camera/recorder is set to "CAM", no signal can be transmitted.
5. Press the PLAY button. Now, the playback picture appears on the TV screen.
   NOTE: When you use the remote control to operate the camera/recorder, point it at the infrared receiver of the camera/recorder. You cannot operate the camera/recorder by pointing the remote control at the AV optical receiver.
6. When playback is finished, set the Operate switch of the camera/recorder to "OFF".

Controllable Range







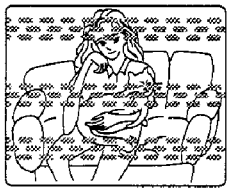
NOTES:

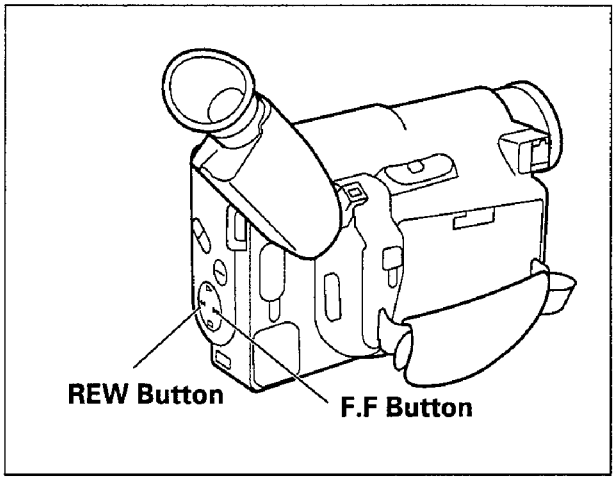
- Use the AV optical receiver indoors.
- The picture and sound may be interrupted or noise may occur when the AV optical receiver is exposed to direct sunlight or strong artificial light from a fluorescent light, etc. or when infrared light from a TV or other electrical appliance's remote control strikes the receiver. In this case, change the installation position of the AV optical receiver.
- If the signal from the camera/recorder strikes the infrared receivers of the TV or VCR, the TV and VCR may not be operated by their remote control units. In this case, change the installation position of the AV optical receiver.
- With some TVs, noise may occur in the picture and sound when the AV optical receiver is exposed to interference from electromagnetic wave emitted by the TV. In this case, change the position of the AV optical receiver.
- This operation cannot be done if there is an obstacle between the camera/recorder's transmitter and the AV optical receiver.
- If infrared light emitted by the edit remote control (optional) strikes the AV optical receiver, noise may occur in the picture and sound.
- Take care not to block the signal during playback, or the picture and sound will not appear on the TV.
- The quality of the picture and sound played back through this operation deteriorates slightly. Use the audio/video cable (provided) for higher quality dubbing.
- If the AV optical receiver is installed in an AV rack, etc., the distance from which the signal can reach the receiver from the camera/recorder may be shorter due to the rack's glass door.
- As the distance to the receiver becomes longer, the picture and sound quality deteriorates. The picture and sound quality also deteriorates when the distance is too short.
- If the AV optical receiver is used with two camera/recorders of this type are used simultaneously, interference may occur.

F-SEARCH AND R-SEARCH

When you press F.F or REW button during playback, the tape will be played back at a speed about 7 times (forward search) or 5 times (reverse search) faster than the normal playback speed, and you can easily locate a certain spot on the tape.

NOTE: There will be noise (interference) in the F-search or R-search pictures.



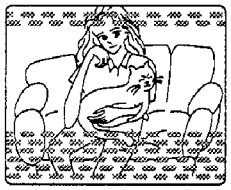


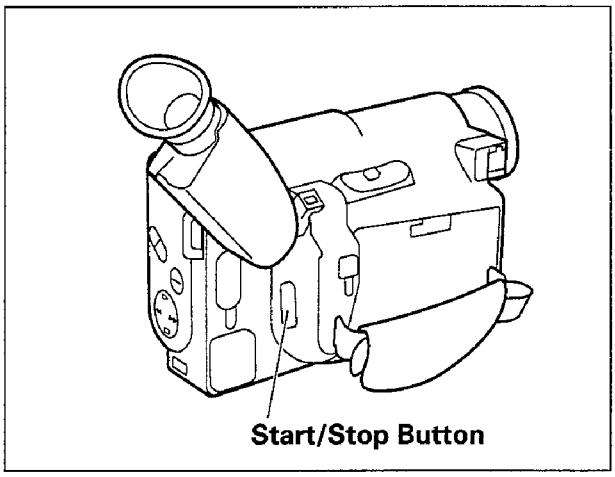
STILL

When Start/Stop button is pressed during playback, a still picture can be seen. To start again press Start/Stop button and playback will be resumed.

NOTES:

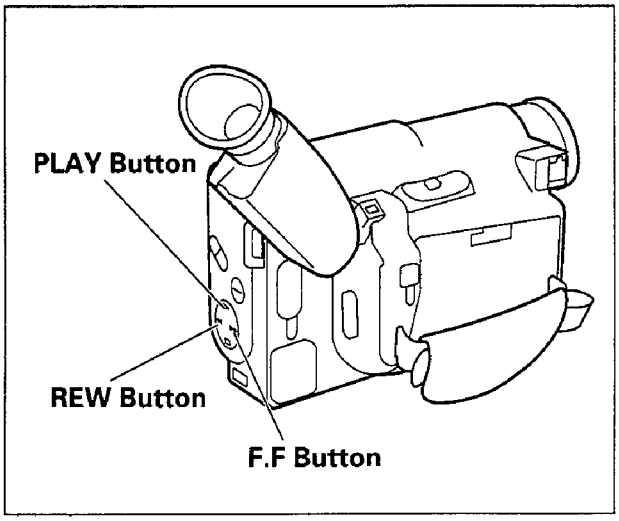
- There will be noise (interference) in the still picture.
- If the play pause mode continues for more than 5 minutes, the camera/recorder will automatically enter the stop mode to protect the tape from damage.



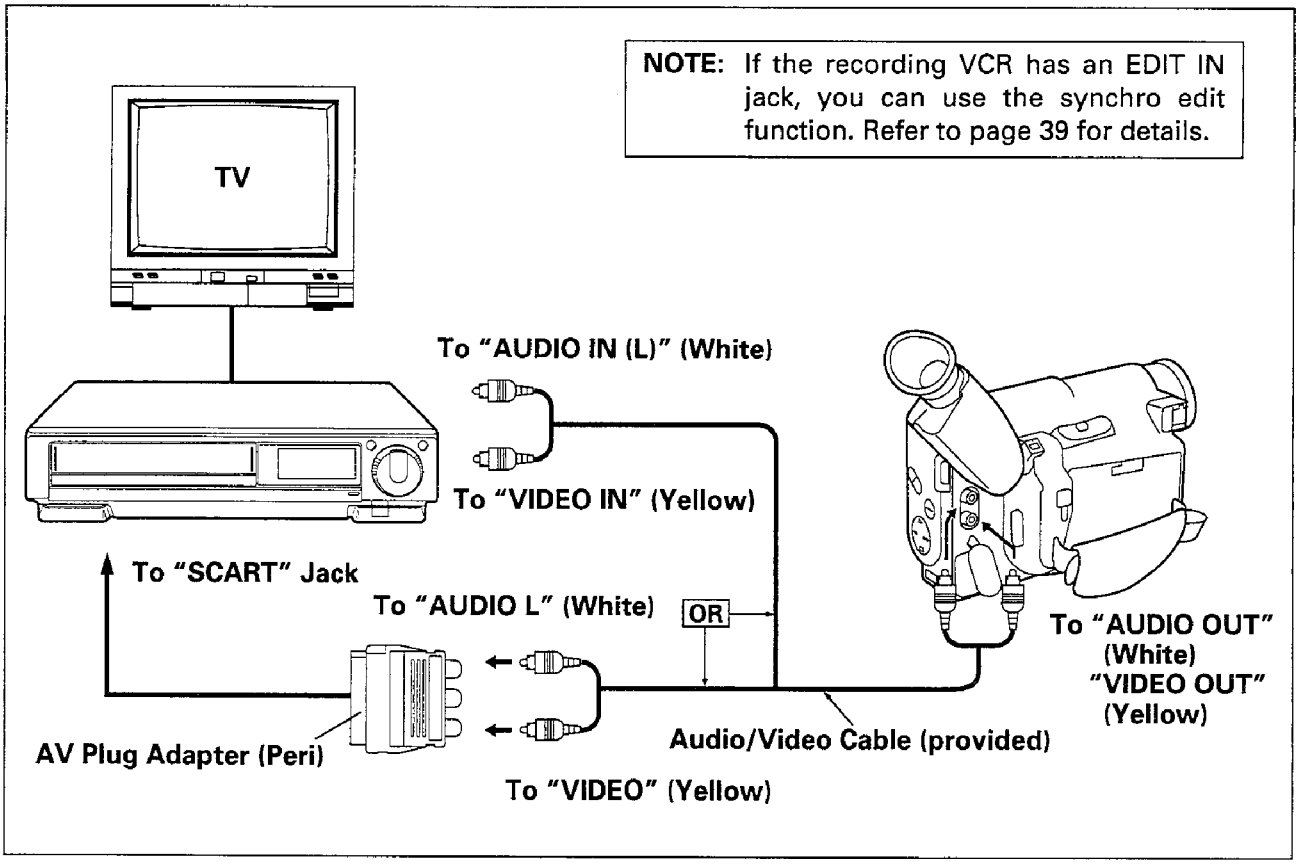


QUICK EDIT

The quick edit feature allows you to search for the end of previously recorded material, or find a particular spot on your tape, to begin your editing, or recording new material. Quick edit is used while the camera/recorder is in the record/pause (stand-by) mode. By holding down the F.F, REW, or PLAY button you can visually search or play your tape. Releasing the buttons (F.F, REW, or PLAY) immediately stops the tape at that position.



CAMERA/RECORDER TO VCR DUBBING

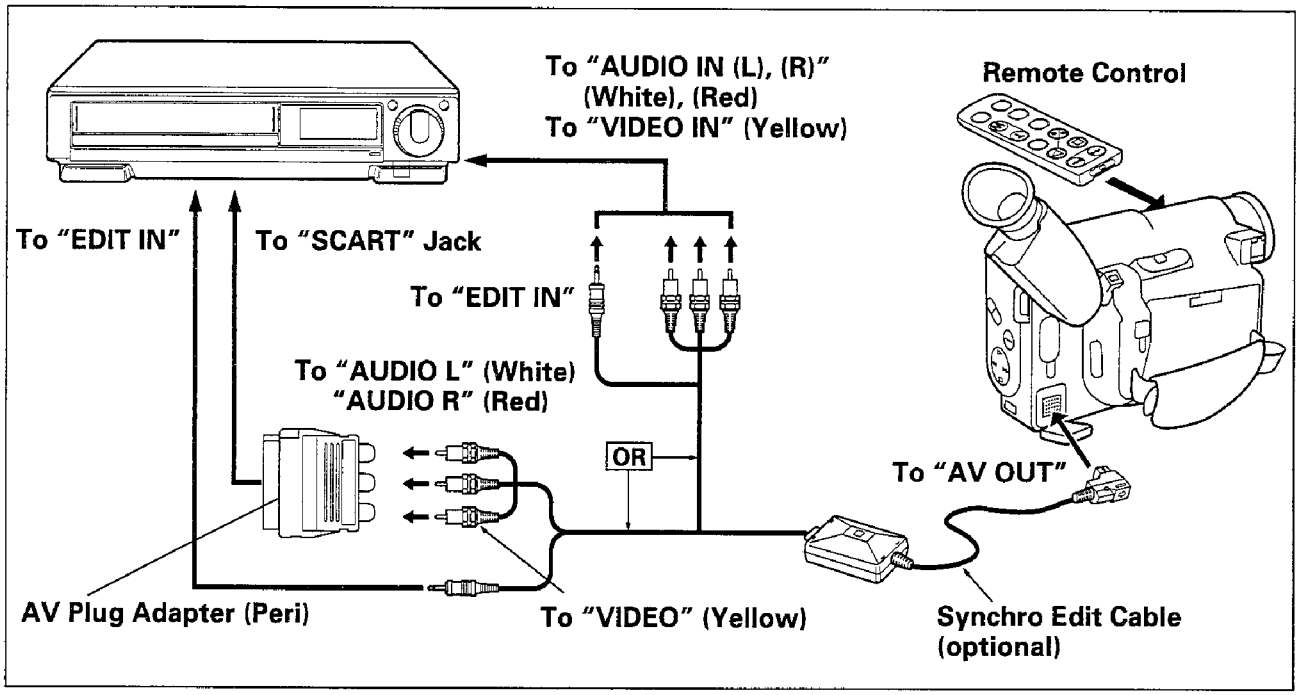

NOTE: If the recording VCR has an EDIT IN jack, you can use the synchro edit function. Refer to page 39 for details.
TV
To "AUDIO IN (L)" (White)
To "VIDEO IN" (Yellow)
To "SCART" Jack
To "AUDIO L" (White)
OR
To "AUDIO OUT" (White)
"VIDEO OUT" (Yellow)
AV Plug Adapter (Peri)
Audio/Video Cable (provided)
To "VIDEO" (Yellow)

1. Connect the camera/recorder, VCR and TV as shown in the figure, and then turn on their operate switches.

   NOTES:
   - Select line input with your VCR. Refer to the instruction manual of your VCR for details.
   - If your VCR has two (stereo) audio inputs, connect the audio plug to the left-channel audio input on the VCR.
2. Insert the cassette used for editing into the camera/recorder and the cassette to be recorded into the VCR.
3. Play the tape on camera/recorder and record it on the VCR.

SYNCHRO EDIT

Synchro edit allows your camera/recorder to control a compatible VCR (one that has an EDIT IN jack) while tapes are being copied from the camera/recorder to the VCR. This is convenient when you want to record only selected segments from a previously recorded tape.



1. Connect your camera/recorder to a compatible VCR as shown above. An optional synchro edit cable is required.

   NOTES:
   - Select line input with your VCR. Refer to the instruction manual of your VCR for details.
   - If your VCR has a single (mono) audio input, connect either the left or right audio plug to the audio input on the VCR.
2. Insert the recorded tape into the camera/recorder.
3. Insert the blank tape into the recording VCR.
4. Point the remote control at the receiver on the camera/recorder and use the remote control to operate the camera/recorder.
5. Press PLAY and then REW or F.FWD button to search to the approximate position of the tape on which you want to dub a picture.
6. Press PLAY button again to search the exact position where you stop dubbing and then press PAUSE button.
7. Press DISPLAY button so that the linear time counter with memory appears and then press COUNTER RESET button to set the counter reading to "0:00:00M".
8. Press REW button to rewind the tape to the approximate position from which you want to start dubbing.
9. Press PLAY button, and when the exact position from which you start to dub is reached, press PAUSE button.
10. Press RECORD button on the VCR. The VCR automatically enters record/pause mode.
    NOTE: If the VCR begins to record instead of pausing, you will need to change the position of the switch on the synchro edit cord. Stop the VCR, change the switch, and then press RECORD button on the VCR again.
11. Pressing S.EDIT button puts the camera/recorder in the review mode for several seconds and then into the playback mode.
    The recording VCR starts recording and stops automatically when the counter reading of the camera/recorder reads "0:00:00M".

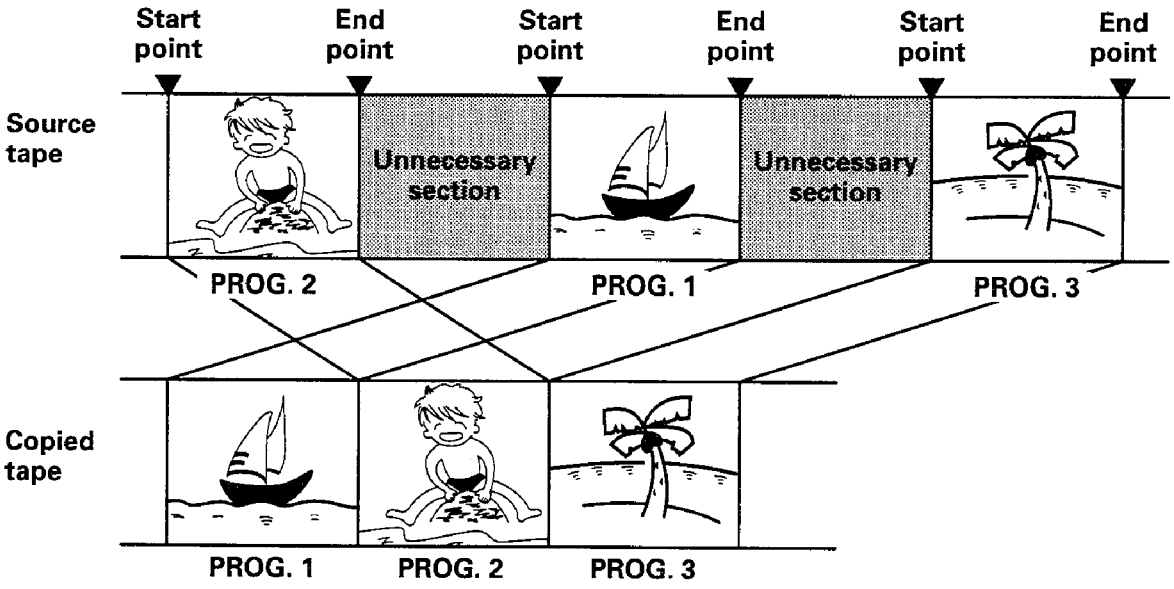
NOTES:
- Pressing REW, F.FWD, STOP or PAUSE button automatically puts the VCR into the record/pause mode. This allows you to search (forward or backward), fast-forward or rewind the tape in the camera/recorder without disturbing the tape in the VCR.
- To search forward (or backward), press F.FWD (or REW) button. When you press PLAY button, the camera/recorder will resume normal playback. To begin copying again, press PAUSE button and then the S.EDIT button.
- To fast-forward (or rewind) the tape, press STOP then F.FWD (or REW). To begin copying again, press STOP, then PLAY, then PAUSE to pause the camera/recorder, and S.EDIT to begin copying.
- If the tape counter reads "0:00:00M" you cannot start recording.

SIMPLE PROGRAMMABLE EDIT (The edit remote control is optional)

Simple programmable edit allows you to programme your camera/recorder to select the scenes you want to copy from a pre-recorded tape. Use the edit remote control (optional) to easily copy scenes from a recorded tape in the camera/recorder (playback machine) onto a blank tape in a table-top VCR which handles infrared remote signals (recording machine).

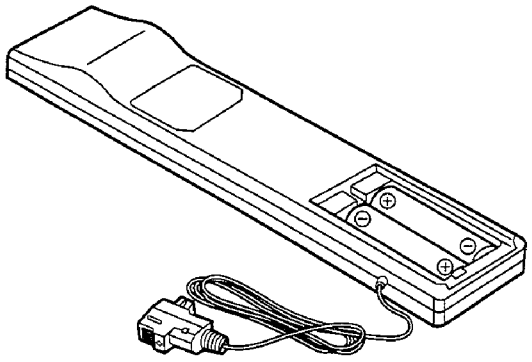
NOTES

- Only the VM-RM20EDE edit remote control (optional) can be used with this camera/recorder.
- Some VCRs cannot be operated by the edit remote control (optional).



■ How to install the batteries

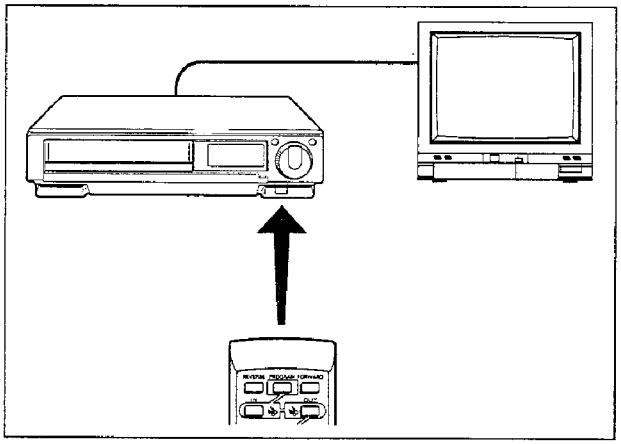
- Be sure to install two IEC R6 batteries before use.
- Be careful to install with the correct polarity.



Cautions on batteries

- Do not use the old and new batteries at the same time.
- Do not mix batteries of different types.
- Do not short, take apart or dispose of batteries by throwing them into a fire.
- When liquid leaks, wipe it off completely and then insert new batteries.

■ Remote controllable range

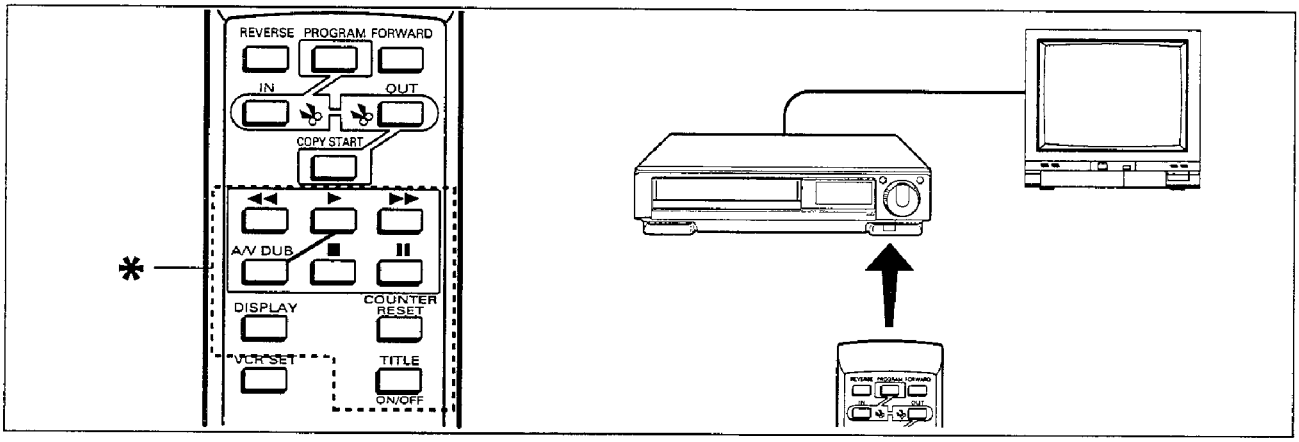


Cautions on the remote control

- Point the remote control straight at the VCR's infrared receiver for operation.
- Use the remote control indoors. When the infrared receivers of the VCR and camera/recorder are exposed to direct sunlight or strong artificial light, the remote control may not operate correctly.
- The remote control cannot be operated if there is an obstacle between the remote control and infrared receiver. Especially, be careful of this during dubbing.

■ Programming the remote control for the VCR

It is necessary to programme the edit remote control code to match the VCR before starting editing.



1. Turn the VCR on.
2. Aim the remote control at the infrared receiver on the VCR and press the VCR SET button on the remote control and hold it, then press the button corresponding to the VCR's maker code. For example, if you have a PHILIPS VCR, press the VCR SET button and hold it, then press the ⏸ button. To check whether the remote control code matches that of your VCR or not, point the remote control at the infrared receiver on the VCR and press the VCR SET button and hold it. If the remote control code has been set, the VCR channel is counted up automatically.

NOTES:

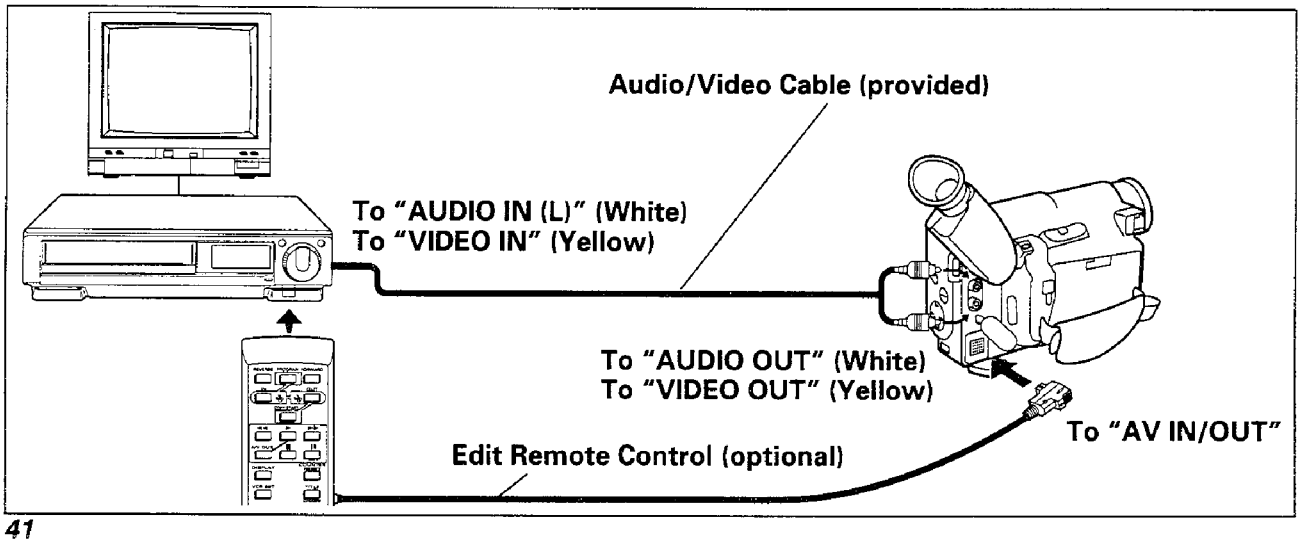
- Your VCR should have an infrared remote control.
- If the channel on the VCR does not change with the above operation, you need to switch the remote control code of your VCR. Refer to the VCR's instruction manual. If the channel still does not change after you have changed the VCR's remote control code, the edit remote control cannot operate your VCR.
- The remote control code is held in memory until it is changed or the batteries are replaced.

VCR maker	Press VCR SET and the following button
HITACHI	REVERSE
SONY	PROGRAM
Panasonic	FORWARD
TOSHIBA	IN
MITSUBISHI	COPY START
SANYO	OUT
SHARP	◀◀
NEC	▶
JVC	▶▶
AKAI	A/V DUB
Gold Star	■
PHILIPS	⏸
LOEWE	DISPLAY
Grundig	COUNTER RESET
THOMSON	TITLE ON/OFF

- When the edit remote control is connected to the camera/recorder, the buttons marked * in the figure above perform the same operations as those of the other remote control provided.

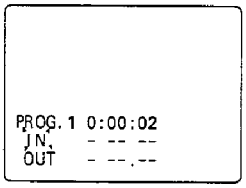
■ Operation

You can select up to four different scenes or segments to be copied at one time.

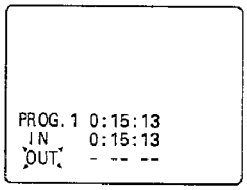


1. Use the audio/video cable to connect the camera/recorder and VCR as illustrated and then connect the edit remote control to the camera/recorder.

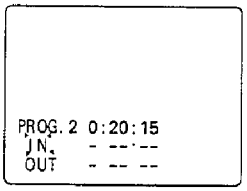
   NOTE: If your VCR has two (stereo) audio inputs, connect the audio plug to the left-channel audio input on the VCR.
2. Insert a recorded tape into the camera/recorder.
3. Set the Operate switch of the camera/recorder to "VIDEO".
   Turn the recording VCR on and select line input.
4. Press the PROGRAM button of the remote control. The programme display appears in the viewfinder.



   NOTE: If your VCR is connected to a TV, the programme display will also appear on the TV screen.
5. Press the ▶ button and use the ▶▶ or ◀◀ button to search for the starting point of the segment you want to copy. Press ▶ and then ❚❚ to set the camera/recorder to the play pause mode.
   The liner time counter counts when searching for the starting point.
   Use the FORWARD and REVERSE buttons in the play or pause mode to fine adjust the tape position. Press FORWARD and hold it; the tape is played while the button is held. Press REVERSE and hold it for reverse play.
6. Press the IN button to store the counter reading. When you press the IN button, "OUT" flashes in the programme display.



7. Press the ▶▶ button to search for the end of the segment you want to copy. Press ▶ and then ❚❚ to set the camera/ recorder to the play pause mode. Use the FORWARD or REVERSE button as required to fine adjust the tape position.
8. Press the OUT button to store the counter reading at the end of the scene.



9. Continue programming as described above until you have entered up to four different segments.
10. Load a blank tape, then set the VCR to the record pause mode.
11. Point the remote control at the receiver on the VCR and press the COPY START button to start simple programmable edit.
    - The camera/recorder automatically searches for the beginning of the first segment and starts playback. The recording VCR automatically starts recording.
    - After recording the first segment, the camera/recorder automatically searches for the beginning of the next segment and resumes playback. The recording VCR is automatically released from the record pause mode and resumes recording.
    - It continues recording and pausing until all the programmed segments are edited.
12. When simple programmable edit is finished, the camera/recorder will enter the stop mode, and the VCR will enter the record pause mode.
    NOTE: After the simple programmable edit is finished, the programmed data is erased. If you want to continue editing other segments, repeat steps 5 – 12.

NOTES:

- If you make a mistake during programming, start again from the beginning or press the COUNTER RESET button to return to the previous steps one by one and enter the correct programme data.
- Most VCRs (recording machine) may be released from the record pause mode if it continues for more than five minutes.
- The dubbing start and end positions may slightly drift from the specified positions when certain VCRs are used.
- If you perform programmable simple edit using the optical link function, the infrared rays from the edit remote control may strike the AV optical receiver and noise may occur in the picture and sound. We recommend that you use the AV output cable for simple editing.

■ To end programmable simple edit

Press the PROGRAM button to remove the programme display from the viewfinder. Then press the stop button on the recording VCR to set it to the stop mode.

NOTE: If the Operate switch of the camera/recorder is set to "OFF" or "CAM" when the recording VCR is in the record pause mode, the VCR enters the record mode.

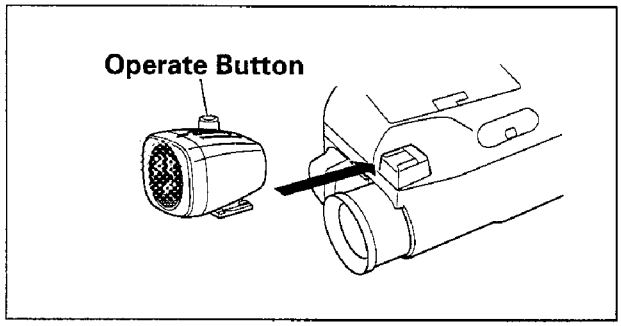
ATTACHING THE OPTIONAL DC CAMERA LIGHT

Use the DC camera light if you wish to shoot objects in dark places.

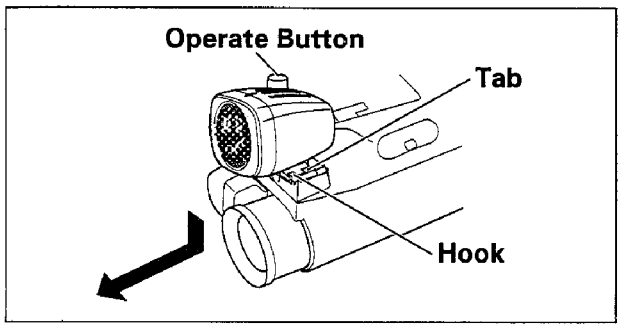
NOTES:

- When the DC camera light is used, the operation time of the camera/recorder becomes short even if a fully-charged battery pack is attached.
- When the camera/recorder is turned on, a voltage is always generated at the installation terminal of the DC camera light. Never touch this terminal.

1. Make sure that a fully charged battery pack or AC adapter/charger is attached.
2. Check that the camera/recorder is turned off.
3. Attach the DC camera light to the camera light shoe.



4. Turn on power of the camera/recorder and then press operate button of the DC camera light when required.
   NOTES:
   - Turn on the camera light only when you need it. Otherwise the operation time of the battery pack becomes shorter because the power consumption of the camera light is high.
   - If the DC camera light is turned on and off during recording, there could be noise in the picuture. Watch the battery charge indicator especially when using a battery as the power source.
5. To remove the camera light, depress the light to release the tab from the hook and then move the light in the direction of the arrow as shown in the figure.

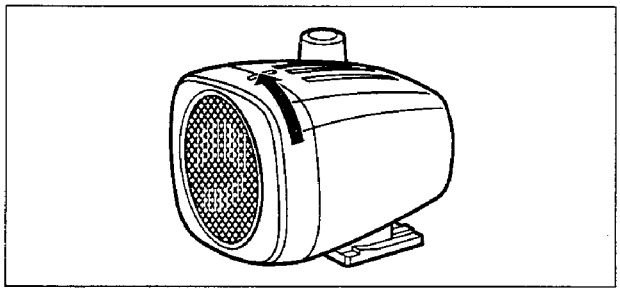


NOTES:

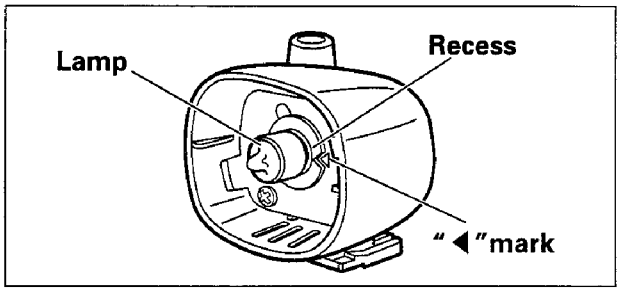
- The front and lamp of the DC camera light become very hot during use of the camera light or immediately after use. Be careful that your hand or hair does not touch them.
- Never touch the terminal of the DC camera light with your hand or short it using metal.
- When the camera light is on, do not allow water to drop on the light.
- When the camera light is on, avoid subjecting the camera light to impacts or sharp vibrations.
- Do not allow the cooling vents to become blocked. Also, do not cover the camera light with paper or other objects, since the air flow will be interrupted, resulting in possible overheating hazard.
- Never use the camera light in the vicinity of explosive or highly inflammable materials.
- When storing the camera light in the camera case following use, be sure to allow it sufficient time to fully cool down before placing it in the case.
- Replace only with the specified lamp (optional accessory), to reduce the risk of fire.

To replace the lamp of the camera light

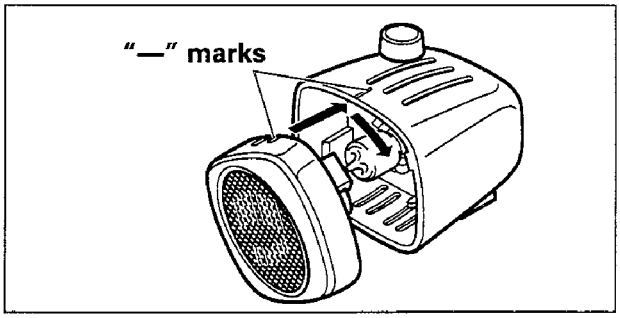
■ Turn the front case in the direction of the arrow to remove it.



■ To install the lamp in the camera light, align the recess of the lamp and the "◀" mark of the camera light.



■ Press the lamp through the hole of the reflective plate and re-attach the front case to the camera light by aligning the "—" marks of the front case and camera light, then turn the case in the direction of the arrow.

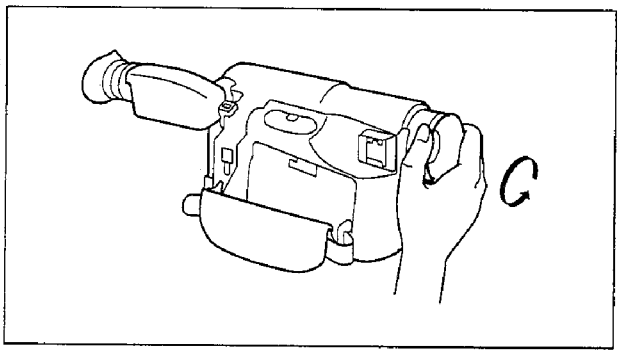


NOTES:

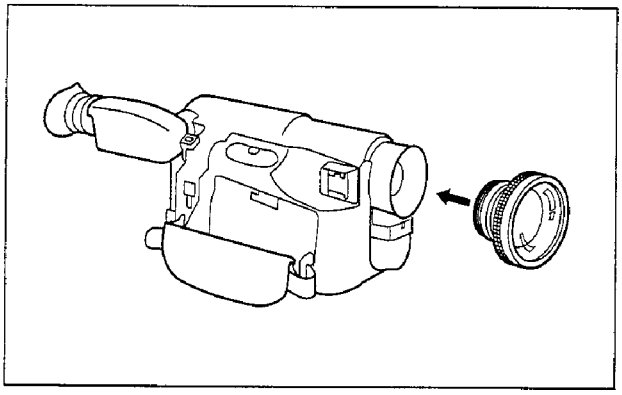
- Do not touch the lamp directly with your fingers. It may shorten its service life.
- When the lamp is replaced, or when the front case of the camera light is removed, make sure the front case is attached to the camera light properly.

ATTACHING THE TELE OR WIDE CONVERTER

1. To remove lens hood, turn it counterclockwise.



2. Remove both caps of the tele or wide converter.
3. Screw the lens into the threads on the front of video camera/recorder lens assembly.



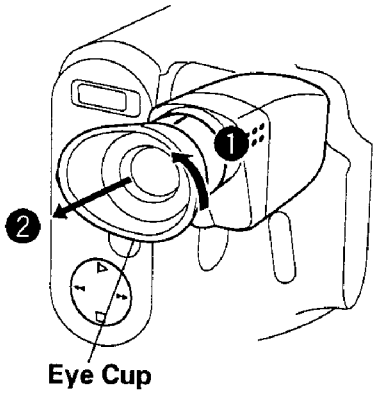
TROUBLESHOOTING

Symptom	Check Point & Correction
Cassette holder cannot be opened when you slide EJECT switch.	Connect the power source.
Cassette cannot be inserted into cassette compartment.	Load cassette in direction indicated by arrow on cassette.
	The cassette window must be towards the outside.
Picture does not appear in the viewfinder.	Remove the lens cap.
	Slide Operate switch to "CAM" position.
The camera/recorder cannot go into the recording mode, even when Start/Stop button is pressed.	Check the record-protect tab on the cassette. See page 15 for details.
	Set Operate switch to "CAM" position.
	Push the cassette holder embossed PUSH LOCK to close it.
	The " ▬ " indication in the viewfinder flashes to indicate battery is discharged. Try another battery or charge the battery.
PLAY button cannot be engaged.	Set Operate switch to "VIDEO" position.
Interference on playback picture. (The TV is connected to the camera/recorder using the RF output adapter.)	When you see the playback picture on your TV, adjust fine tuning knob on television set to obtain the best picture.
Picture is out of focus. Auto-focus does not operate correctly.	Press FOCUS control buttons simultaneously to erase "FOCUS" in the viewfinder.
	Auto-Focus does not operate correctly if a special-effects filter is attached or with the objects shown on page 19.
Power is interrupted.	If the record pause mode continues for more than 5 minutes, power is shut off automatically. Press the Start/Stop button to restore the power.
Power is turned on, but no button operations are accepted.	Remove the power source and the clock battery. And after about one minute, the display in the viewfinder will be reset. Then set the information again.
The camera/recorder does not operate when alkaline batteries are inserted.	Check that the polarities (+,–) of the batteries are correct.
	Insert six batteries.
"TAPE" appears in the viewfinder.	Have you moved the camera/recorder or cassette from a cold place to a warm place so that its temperature changed abruptly? If the temperature has changed, remove the cassette and set the Operate switch to OFF, then wait for about one hour.
	Remove the cassette and then try to reinsert: remove it several times. If the indication is still shown in the viewfinder, use a cleaning tape to clean the heads and replace the cassette.

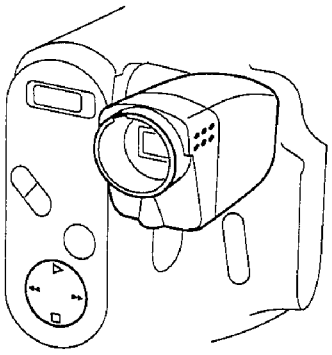
Symptom	Check Point & Correction
Optical link does not operate. Noise appears in the picture played back via the optical receiver.	If there is any obstacle between the AV optical receiver and camera/recorder no signal can be transmitted from the camera/recorder to the AV optical receiver.
	Check the location of the camera/recorder and the position where the AV optical receiver is installed. Refer to pages 34 ~ 36 for details.

■ CLEANING THE INSIDE OF THE ELECTRONIC VIEWFINDER

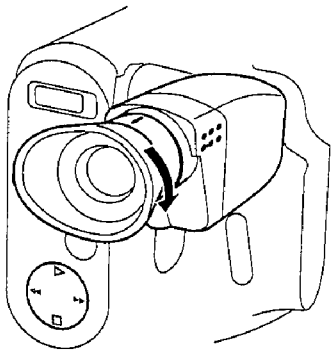
If dust or foreign matter adheres inside the viewfinder, clean it by using the following procedure.



1. Rotate and remove eye cup.



2. Clean the picture tube face and lens.
   To prevent scratching, use a soft non abrasive cloth, swab or lens cleaning paper.



3. Fit the projection of the eye cup into the groove in the viewfinder and rotate the eye cup in the direction of the arrow.

MAINTENANCE

1. To maintain the optimum performance of this camera/recorder, regular periodic maintenance is required. Your dealer will advise you further.
2. Maintenance and adjustments may not be carried out by the user. In all cases of difficulty or doubt, consult your dealer.
3. Head cleaning
   Dirt accumulated on the video heads after a period of time may cause the playback picture to become blurred or part of the video information to be lost. This does not mean that the recorded programme has been erased but head cleaning is required.
   Use a dry type head cleaning tape to clean the video heads.
   When it is difficult to remove a dirt using the head cleaning tape, head cleaning requiring highly technical care is necessary.
   Consult your nearest dealer or VCR service centre for head cleaning.

SPECIFICATIONS

■ General

Power requirements	6V DC
Power consumption	VM-E120E: 4.8 watts (when recording) VM-E220E: 4.8 watts (when recording) VM-E420E: 4.9 watts (when recording)
Operating temperature	0°C to 40°C
Operating humidity	< 80%
Storage temperature	– 20°C to 60°C
Dimensions	94(W) x 120(H) x 211(D) mm
Weight	Approx. 860g (without battery pack, lens hood, lens cap and cassette)

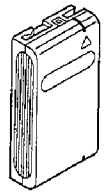
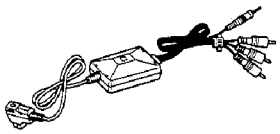
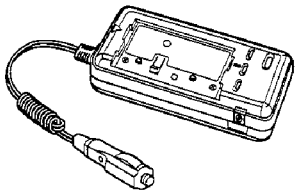
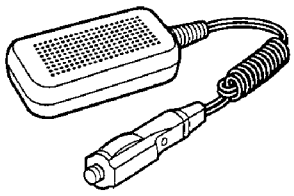
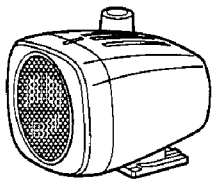
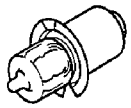
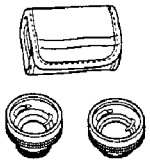
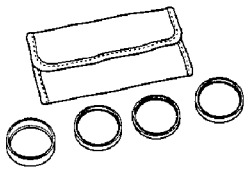
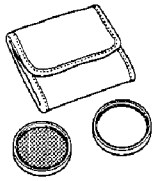
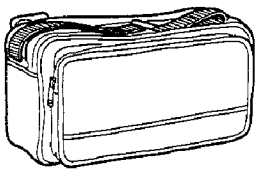
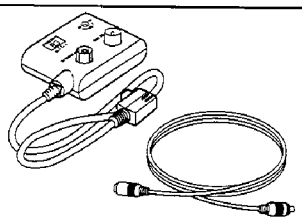
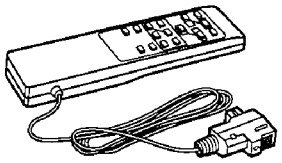
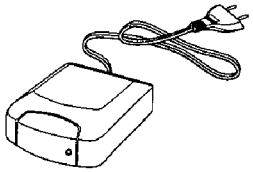
■ Video Recorder Section

Format	8 mm
Record/playback system	Two video record/playback heads
Video signal	PAL colour & CCIR monochrome signals 625 lines
Tape speed	SP: 20.05 mm/sec.
Video output	1.0 Vp-p, 75 ohm
Audio output	– 8 dBs, less than 1K ohm
Fast forward/rewind time	Less than 8 minutes with P5-90 cassette

■ Camera Section

Scanning	625 lines/50 fields/25 frames
Required minimum illumination	VM-E120E: 2 lux VM-E220E: 2 lux VM-E420E: 3 lux
Camera device	1/4" C.C.D
Lens diameter	46 mm

OPTIONAL ACCESSORIES

Battery Pack (for standard play) VM-BP84	Synchro Edit Cable VM-CH95	Car Adapter Charger VM-CA80E	Car Battery Cord VM-CC80E
			
DC Camera Light VM-CP4	Lamp for Camera Light VM-CP4L	Conversion Lens Set VM-CL12TW	Filter Kit VM-FL60K
			
Filter Kit VM-FL46K	Soft Case VM-CB55SR	RF Output Adapter VM-RF85E(R)	Edit Remote Control VM-RM20EDE
			
AV Optical Receiver VM-IR20E			
 (Only for VM-E420E)			

■ GERMANY
HITACHI SALES EUROPA GmbH
Rungedamm 2, 21035 Hamburg,
Germany
Tel: 040 734110

■ ENGLAND
HITACHI SALES (U.K.) Ltd.
Hitachi House, Station Road, Hayes,
Middlesex UB3 4DR, U.K.
Tel: 081-849-2000

■ SWEDEN
HITACHI SALES SCANDINAVIA AB
Domnarvsgatan 29, Lunda
BOX 62, 163 91
Spånga, Sweden
Tel: 08-6218-256

■ NORWAY
HITACHI SALES NORWAY A/S
P.O. Box 68, Bruket 31, 1620 Gressvik,
Norway
Tel: 69-32-82-55

■ FINLAND
HITACHI SALES SCANDINAVIA AB FINLAND OFFICE
Takojankotu 5, 15800 Lahti 80, Finland
Tel: 18-52-7801

■ DENMARK
HITACHI SALES SCANDINAVIA AB DENMARK OFFICE
Kuldyssen 13, DK-2630 Taastrup, Denmark
Tel: 42-999200

■ FRANCE
HITACHI FRANCE S.A.
95-101 Rue Charles-Michels,
93200 Saint-Denis, France
Tel: 1-48-13-60-00

■ GREECE
HITACHI SALES (HELLAS) S.A.
91 Falirou St., 11741 Athens, Greece
Tel: 92 42 620

■ CANARY ISLANDS
HITACHI CANARIAS S.A.
Calle Arequipa, 8 Urbanizaction el Cebadal
Las Palmas de Gran Canaria,
Canary Islands
Tel: (28) 46-32-72

■ SWITZERLAND
HITACHI SALES A.G.
Bahnhofstrasse 19, 5600 Lenzburg,
Switzerland
Tel: 064-502211

■ AUSTRIA
HITACHI SALES WARENHANDELS GmbH
Laxenburger Strasse 228
Eingang Deutschstrasse 19
1232 Wien, Austria
Tel: 1-610880

■ ITALY
HITACHI SALES ITALIANA S.p.A.
Via A. Kulisciоff No. 33, 20152
Milano, Italy
Tel: 2-48326

■ NETHERLAND
HITACHI SALES BENELUX S.A./N.V
NETHERLAND BRANCH OFFICE
Essenkade 3, 3992 AB Houten,
The Netherland
Tel: 03403-59100

■ BELGIUM
HITACHI SALES BENELUX S.A./N.V
Chaussee de Namur 56,
B-1400 Nivelles, Belgium
Tel: 32-67-28-2511

■ SPAIN
HITACHI SALES IBERICA S.A.
Gran Via Carlos Tercero, 101, 1-1
Barcelona-08028, Spain
Tel: 3-330-8852

■ AUSTRALIA
HITACHI SALES AUSTRALIA PTY. LTD.
QLD.: Cnr. Kingsford-Smith Drive and
Sugarmill Road, Eagle Farm 4007
Tel: (07) 260-1344
VIC: 153 Keys Road, Moorabbin 3189
Tel: (03) 555-8722
N.S.W.: 27 William Street, Botany, 2019
Tel: (02) 666-3088

Hitachi, Ltd. Tokyo Japan
THE HITACHI ATAGO BLDG.
No. 15-12, 2-chome, Nishi-Shinbashi,
Minato-ku, Tokyo 105, Japan
Tel.: Tokyo (03) 3502-2111

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